

SUZUKI

GSX650FA

SUPPLEMENTARY SERVICE MANUAL

USE THIS MANUAL WITH:
GSF650/A/S/SA GSX650F SERVICE MANUAL (99500-36172-01E)



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FOREWORD

This SUPPLEMENTARY SERVICE MANUAL is a supplement to SUZUKI GSF650/A/S/SA GSX650F SERVICE MANUAL.

It has been prepared exclusively for the following applicable model.

Applicable model:

GSX650FAK9

This supplementary service manual describes only service information which differ from that of the main manual. Therefore, whenever servicing the above applicable model, consult this supplement first. And for any section, item or description not found in this supplement, refer to the main manual below.

Main Manual:

Manual Name	Manual No.
GSF650/A/S/SA GSX650F SERVICE MANUAL	99500-36172-01E

Other information considered as generally known is not included.

Read the GENERAL INFORMATION section to familiarize yourself with the motorcycle and its maintenance.

Use this section as well as other sections to use as a guide for proper inspection and service.

This manual will help you know the motorcycle better so that you can assure your customers of fast and reliable service.

- * This manual has been prepared on the basis of the latest specifications at the time of publication. If modifications have been made since then, differences may exist between the content of this manual and the actual motorcycle.*
- * Illustrations in this manual are used to show the basic principles of operation and work procedures. They may not represent the actual motorcycle exactly in detail.*
- * This manual is written for persons who have enough knowledge, skills and tools, including special tools, for servicing SUZUKI motorcycles. If you do not have the proper knowledge and tools, ask your authorized SUZUKI motorcycle dealer to help you.*

⚠ WARNING

Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual.

Improper repair may result in injury to the mechanic and may render the motorcycle unsafe for the rider and passenger.

SUZUKI MOTOR CORPORATION

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Section 00

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Precautions

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Precautions

Precautions

Precautions for ABS (GSX650FAK9)

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ABS Wiring

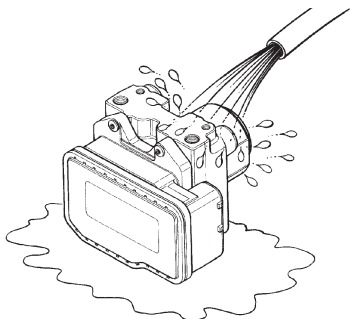
- The ABS parts are connected to various lead wires. The coupler and lead wire connections, as well as the lead wire and wire harness routings must be done correctly. Make sure that the proper clamps are used and positioned correctly.

NOTE

If all of the connections are not properly connected, the ABS may not operate correctly. For connector and coupler precautions. Refer to "Precautions for Electrical Circuit Service in related manual".

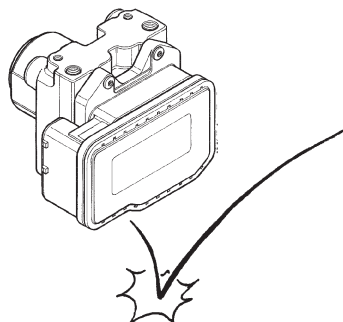
ABS Control Unit/HU

- Never allow dust or water to contact the ABS control unit/HU.



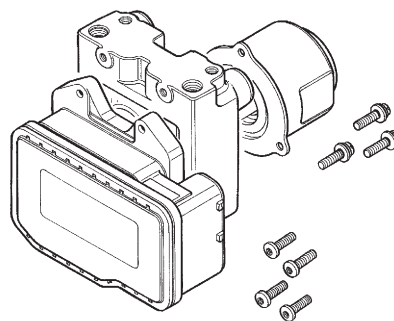
I649G1000004-02

- Never subject the ABS control unit/HU to strong impacts or allow them to be dropped.



I649G1000003-02

- The ABS control unit/HU cannot be disassembled. Replace the whole unit with a new one.



I649G1000005-02

Section 0

General Information

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General Information

General Description

Abbreviations (GSX650FAK9)

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NOTE

Please refer to the GSF650/SK7 ('07-model) service manual for other abbreviations which are not given in this manual.

A:

ABS: Anti-lock Brake System

Vehicle Side View (GSX650FAK9)

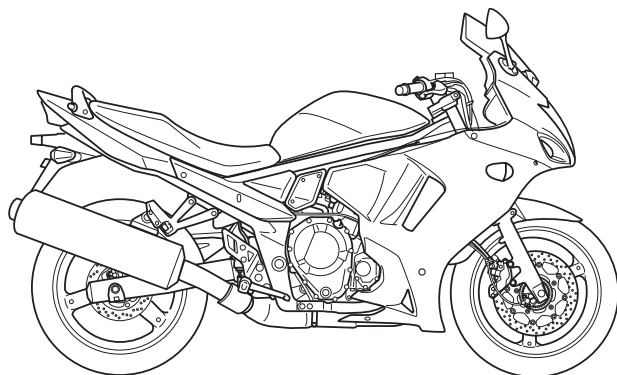
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NOTE

Difference between illustration and actual motorcycles may exist depending on the markets.

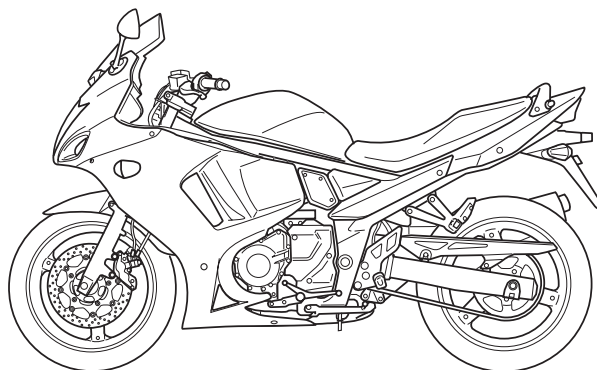
SUZUKI GSX650FA (2009-model)

Right Side



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Left Side



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Country and Area Codes (GSX650FAK9)

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The following codes stand for the applicable country(-ies) and area(-s).

Code	Country or Area	Effective Frame No.
GSX650FA K9 (E-02)	U.K.	JS1CJ136200100001 –
GSX650FA K9 (E-03)	U.S.A (Except for California)	JS1GP74B 92100001 –
GSX650FA K9 (E-19)	E.U.	JS1CJ136100100001 –
GSX650FA K9 (E-24)	Australia	JS1CJ136300100001 –
GSX650FA K9 (E-28)	Canada	JS1GP74B 92100001 –
GSX650FA K9 (E-33)	California (U.S.A)	JS1GP74B 92100001 –
GSX650FUA K9 (E-19)	E.U.	JS1CJ226100100001 –
GSX650FUA K9 (E-24)	Australia	JS1CJ226300100001 –

Specifications

Specifications (GSX650FAK9)

B917H20107007

NOTE

- These specifications are subject to change without notice.
- Any differences between the GSX650FK9 ('09-model) and GSX650FAK9 ('09-model) in specifications are indicated an asterisk mark (*).

Dimensions and curb mass

Item	Specification	Remark
Overall length	2 130 mm (83.9 in)	
Overall width	760 mm (29.9 in)	
Overall height	1 225 mm (48.2 in)	
Wheelbase	1 470 mm (57.9 in)	
Ground clearance	125 mm (4.9 in)	
Seat height	790 mm (31.1 in)	
* Curb mass	245 kg (540 lbs)	

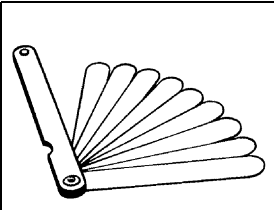
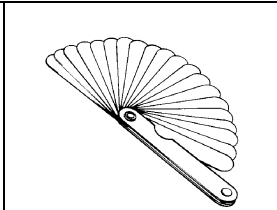
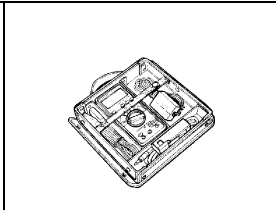
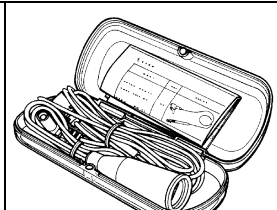
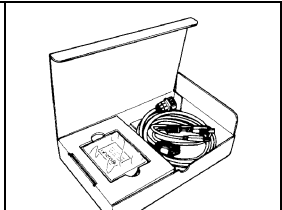
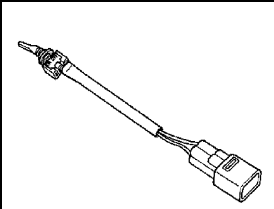

Electrical

Item	Specification	Remark
Ignition type	Electronic ignition (Transistorized)	
Ignition timing	2° B.T.D.C. at 1 200 r/min	
Spark plug	NGK CR8E or DENSO U24ESR-N	
Battery	12 V 28.8 kC (8 Ah)/10 HR	
Generator	Three-phase A.C. generator	
Main fuse	30 A	
Fuse	* 10/10/10/10/15/15/15/15/20 A	
Headlight	12 V 60 W (HB3)	High
	12 V 55 W (H7)	Low
Position light	12 V 5 W x 2	
Turn signal light	12 V 21 W	
Brake light/Taillight	12 V 21/5 W	
License plate light	12 V 5 W	
Speedometer light	LED	
Tachometer light	LED	
Neutral indicator light	LED	
High beam indicator light	LED	
Turn signal indicator light	LED	
Oil pressure/Coolant temperature indicator light	LED	
Fuel injection indicator light	LED	
Engine R.P.M. indicator light	LED	
* ABS indicator light	LED	

Special Tools and Equipment

Special Tool

B917H20108001

 <p>09900-20803 Thickness gauge</p>	 <p>09900-20806 Thickness gauge</p>	 <p>09900-25008 Multi circuit tester set</p>	 <p>09900-25009 Needle-point probe set</p>	 <p>09904-41010 SUZUKI Diagnostic system set</p>
 <p>09930-82710 Mode select switch</p>	 <p>99565-01010-020 CD-ROM Ver.20</p>			

Service Data

Specifications

Service Data (GSX650FAK9)

B917H20307007

NOTE

- These specifications are subject to change without notice.
- Any differences between the GSX650FK9 ('09-model) and GSX650FAK9 ('09-model) in service data are indicated an asterisk mark (*).

Electrical

Unit: mm (in)

Item		Specification	Note
Firing order		1 · 2 · 4 · 3	
Spark plug	Type	NGK: CR8E DENSO: U24ESR-N	
	Gap	0.7 – 0.8 (0.028 – 0.031)	
Spark performance		Over 8 (0.3) at 1 atm.	
CKP sensor resistance		90 – 150 Ω	
CKP sensor peak voltage		2.0 V and more	When cranking
Ignition coil resistance	Primary	1.1 – 1.9 Ω	Terminal – Terminal
	Secondary	10.8 – 16.2 k Ω	Plug cap – Terminal
Ignition coil primary peak voltage		80 V and more	When cranking
Generator coil resistance		0.2 – 0.8 Ω	
Generator maximum output		Approx. 400 W at 5 000 r/min	
Generator no-load voltage (When engine is cold)		60 V (AC) and more at 5 000 r/min	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min	
Starter motor brush length	Standard	7.0 (0.28)	
	Limit	3.5 (0.14)	
Starter relay resistance		3 – 6 Ω	
Battery	Type designation	YTX9-BS	
	Capacity	12 V 28.8 kC (8 Ah)/10 HR	
	Standard electrolyte S.G.	1.320 at 20 °C (68 °F)	
Fuse size	Headlight	HI	10 A
		LO	10 A
	Fuel		10 A
	Ignition		15 A
	Signal		15 A
	Fan		15 A
	Main		30 A
	* ABS motor		20 A
	* ABS valve		15 A

Wattage

Unit: W

Item		Specification
Headlight	HI	60
	LO	55
Position/Parking light		5 x 2
Brake light/Tailight		21/5
Turn signal light		21 x 4
License plate light		5
Speedometer light		LED
Tachometer light		LED
Turn signal indicator light		LED x 2
High beam indicator light		LED
Neutral position indicator light		LED
Oil pressure/Engine coolant temperature indicator light		LED
FI indicator light		LED
Engine R.P.M. indicator light		LED
* ABS indicator light		LED

Suspension

Unit: mm (in)

Item	Standard	Limit
Front fork stroke	130 (5.1)	—
Front fork inner tube O.D.	41 (1.61)	—
Front fork spring free length	* 432 (17.0)	* 423 (16.7)
Front fork oil level (Without spring, outer tube fully compressed)	* 136 (5.4)	—
Front fork oil type	SUZUKI FORK OIL G10 or an equivalent fork oil	—
Front fork oil capacity (Each leg)	* 455 ml (15.4/16.0 US Imp oz)	—
Front fork spring adjuster	5th groove from top	—
Rear shock absorber spring adjuster	3rd position	—
Rear shock absorber damping force adjuster	Rebound 1-1/4 turns out from stiffest position	—
Rear wheel travel	128 (5.0)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

Tightening Torque List (GSX650FAK9)

B917H20307008

Chassis

Item	N·m	kgf·m	lbf·ft
Brake pipe flare nut	16	1.6	11.5
Wheel speed sensor rotor bolt	6.5	0.65	4.7
Rear axle nut	100	10.0	72.5

Section 2

Suspension

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Wheels and Tires

Precautions

Precautions for Wheel and Tire (GSX650FAK9)

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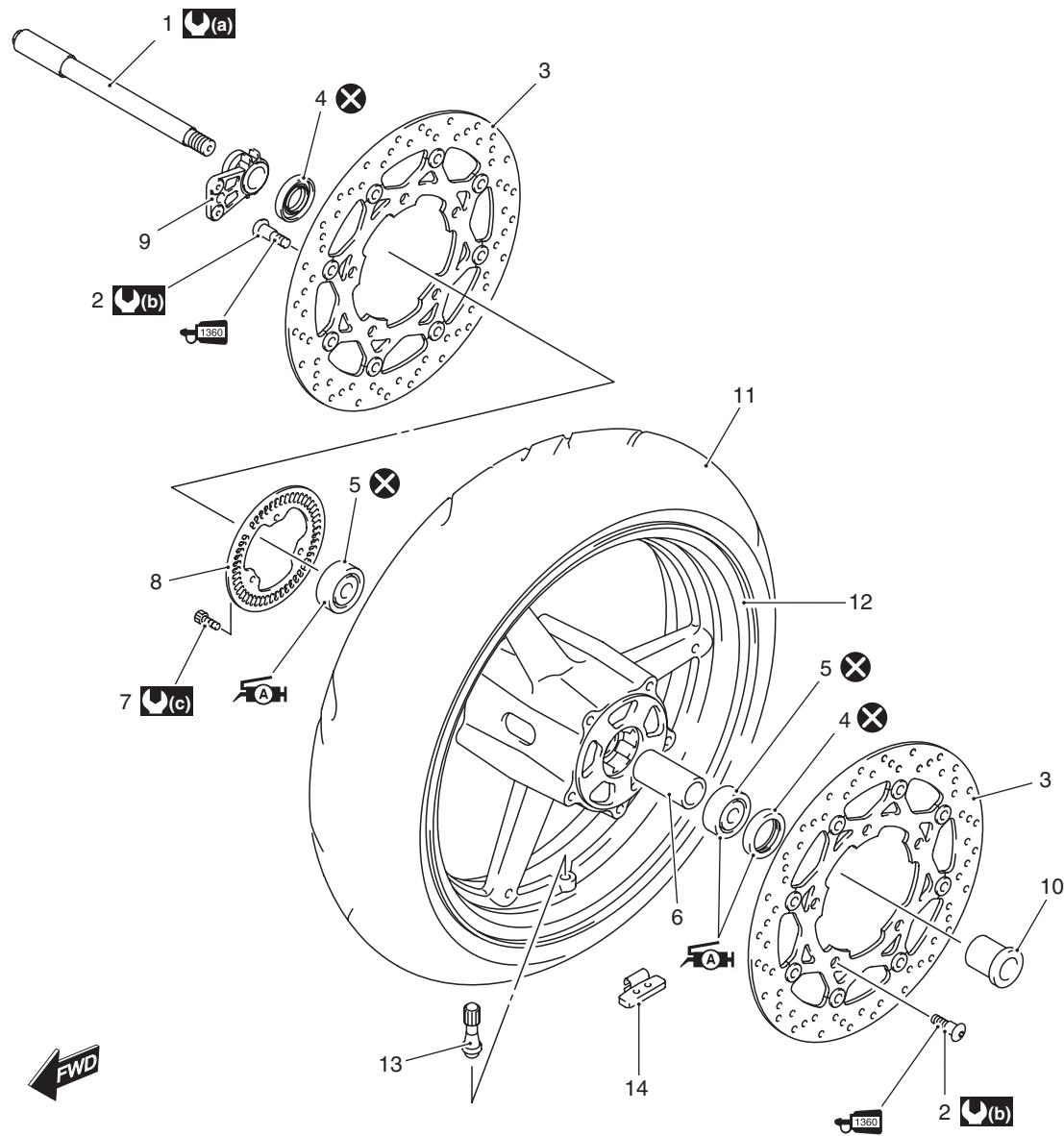
⚠ WARNING

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- Proper tire inflation pressure and loading are important factors to ensure riding safety. Overloading can lead not only to tire damage but also to loss of control.
 - Under-inflation makes it difficult to turn a corner smoothly and results in premature wear of tires.
 - Over-inflation reduces tire's area of road contact and thus results in skidding and loss of control.
 - Do not interchange tires between wheels on the same motorcycle.
Do not use tires of sizes and types different from the originally installed tires.
Rotation of tires or use of such different tires may adversely affect handling of the motorcycle and can result in loss of control.
 - Replace the wheel if it is deformed or has cracks or scratches. Also replace the wheel if its runout exceeds the service limit.
 - Replacement wheels must be equivalent to the originally installed wheels.
-

Repair Instructions

Front Wheel Components (GSX650FAK9)

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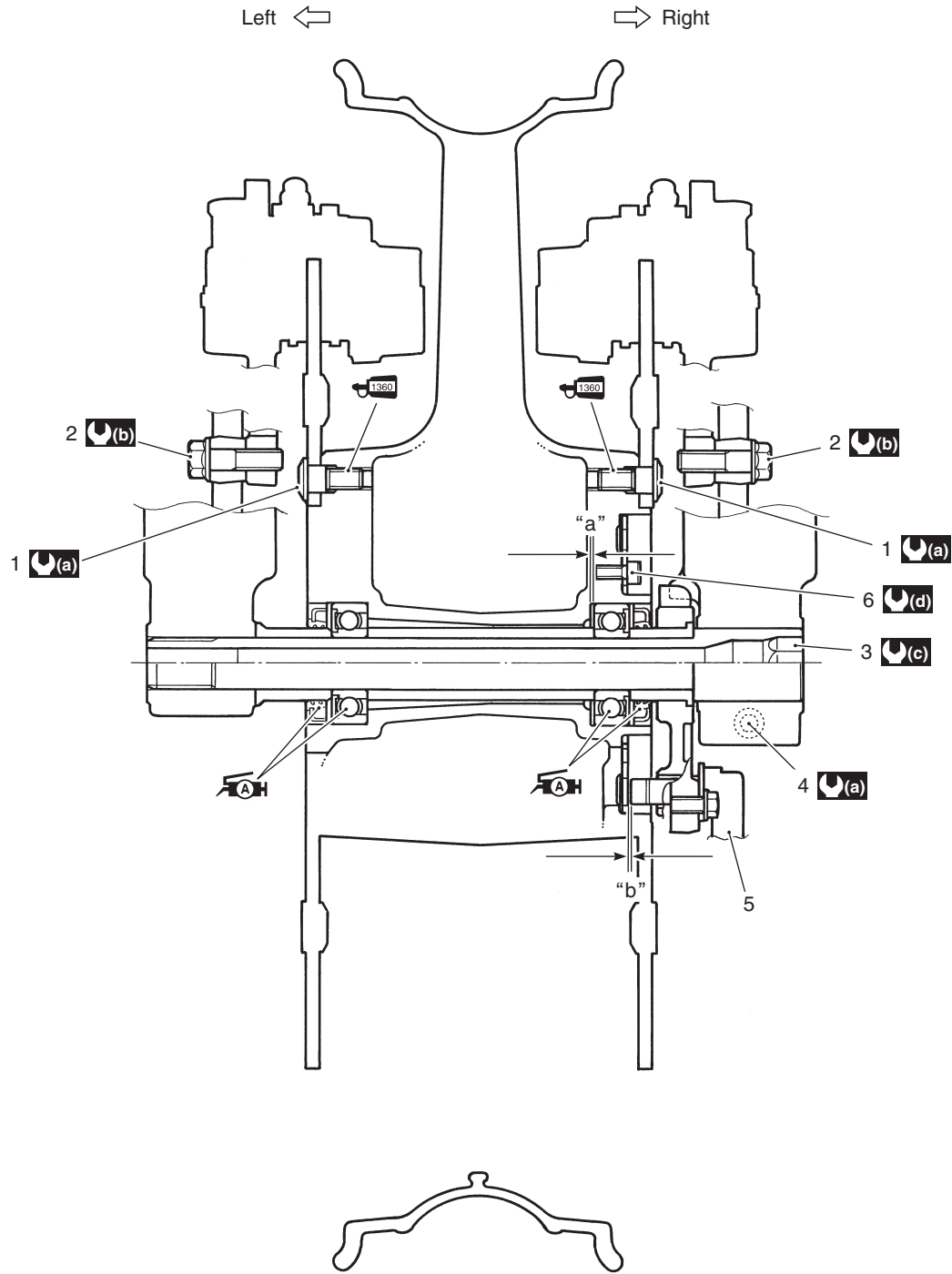


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1. Front axle	6. Spacer	11. Tire	: 100 N·m (10.0 kgf·m, 72.5 lbf·ft)
2. Brake disc bolt	7. Wheel speed sensor rotor bolt	12. Front wheel	: 23 N·m (2.3 kgf·m, 16.5 lbf·ft)
3. Brake disc	8. Wheel speed sensor rotor	13. Air valve	: 6.5 N·m (0.65 kgf·m, 4.7 lbf·ft)
4. Dust seal	9. Wheel speed sensor bracket	14. Wheel balancer	: Apply grease.
5. Bearing	10. Collar		: Apply thread lock to thread part.
			: Do not reuse.

Front Wheel Assembly Construction (GSX650FAK9)

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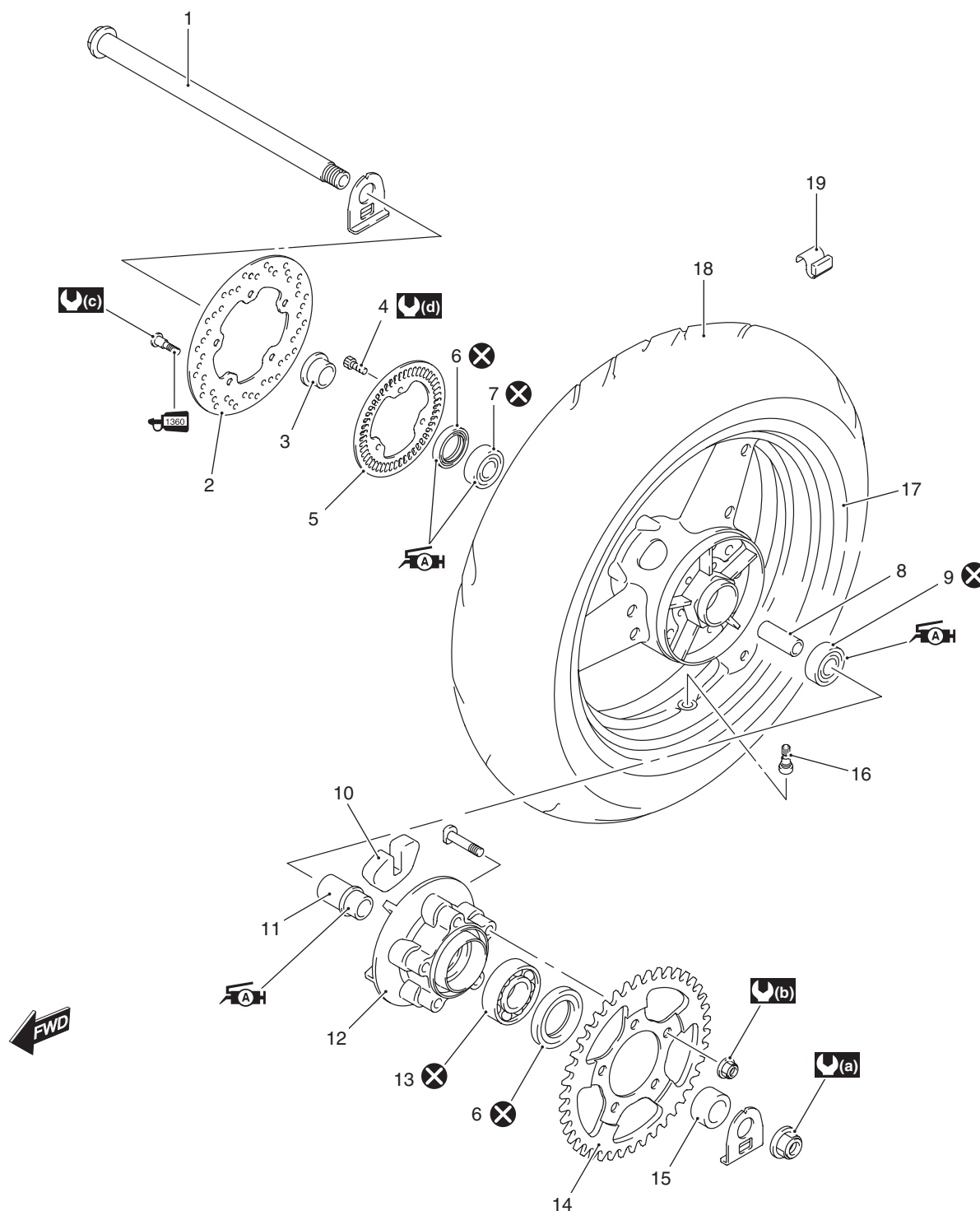


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1. Brake disc bolt	6. Wheel speed sensor rotor bolt	(c) : 100 N·m (10.0 kgf·m, 72.5 lbf·ft)
2. Brake caliper mounting bolt	"a": Clearance	(d) : 6.5 N·m (0.65 kgf·m, 4.7 lbf·ft)
3. Front axle	"b": 0.3 – 1.5 mm (0.012 – 0.059 in)	⌘: Apply grease.
4. Front axle pinch bolt	(a) : 23 N·m (2.3 kgf·m, 16.5 lbf·ft)	1360 : Apply thread lock to thread part.
5. Front wheel speed sensor	(b) : 25 N·m (2.5 kgf·m, 18.0 lbf·ft)	

Rear Wheel Components (GSX650FAK9)

B917H22406024

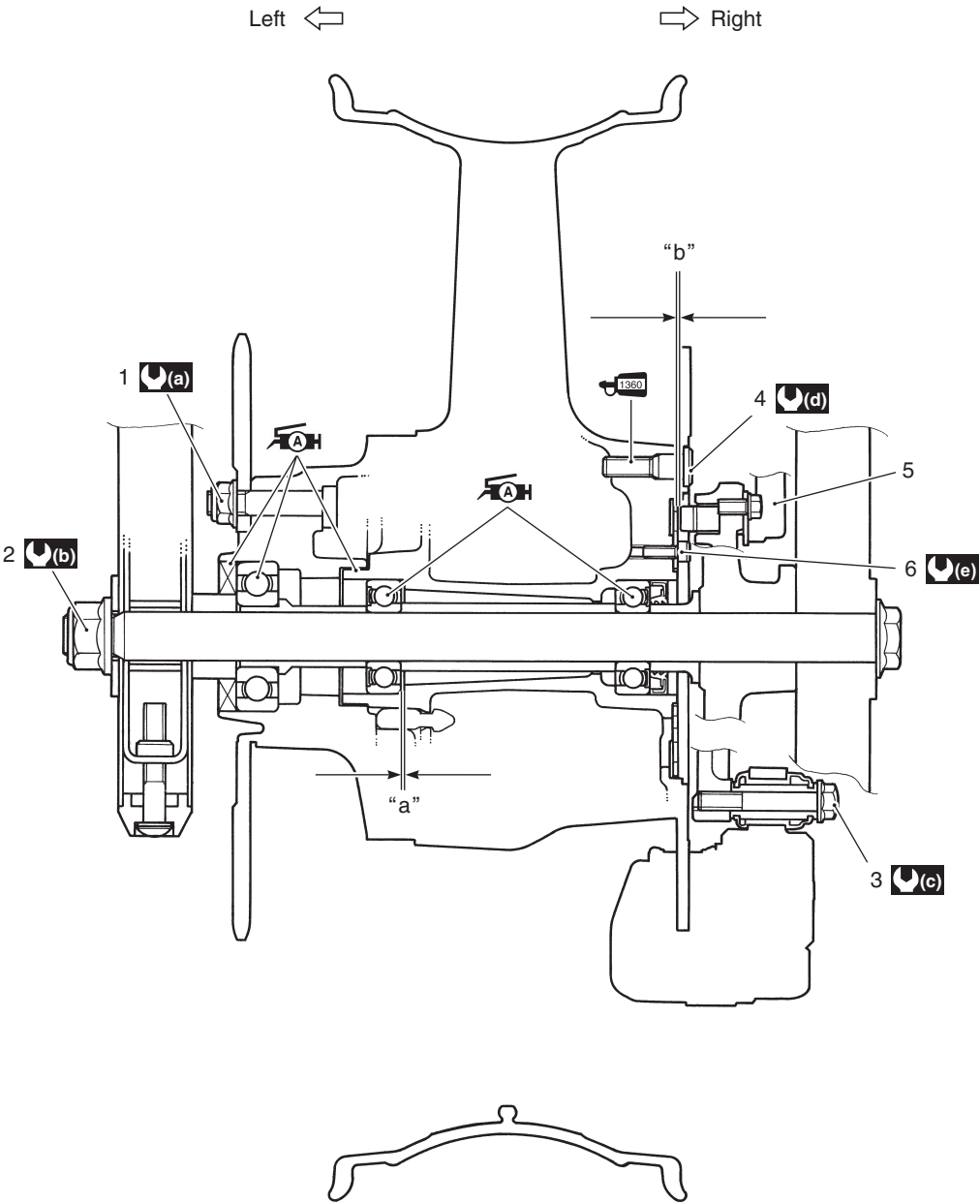


I917H2240013-01

1. Rear axle	8. Spacer	15. Spacer	: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
2. Brake disc	9. Bearing	16. Air valve	: 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)
3. Collar	10. Wheel damper	17. Rear wheel	: Apply grease.
4. Wheel speed sensor rotor bolt	11. Retainer	18. Tire	: Apply thread lock to thread part.
5. Wheel speed sensor rotor	12. Sprocket mounting drum	19. Wheel balancer	: Do not reuse.
6. Dust seal	13. Bearing	: 100 N·m (10.0 kgf-m, 72.5 lbf-ft)	
7. Bearing	14. Sprocket	: 60 N·m (6.0 kgf-m, 43.5 lbf-ft)	

Rear Wheel Assembly Construction (GSX650FAK9)

B917H22406025



I917H2240014-01

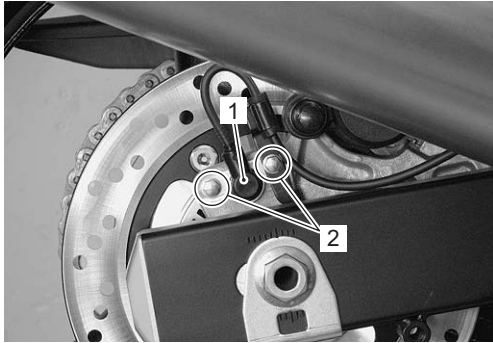
1. Rear sprocket nut	6. Wheel speed sensor rotor bolt	(c) : 22 N·m (2.2 kgf-m, 16.0 lbf-ft)
2. Rear axle nut	"a": Clearance	(d) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
3. Brake caliper mounting bolt	"b": 0.3 – 1.5 mm (0.012 – 0.059 in)	(e) : 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)
4. Brake disc bolt	(a) : 60 N·m (6.0 kgf-m, 43.5 lbf-ft)	(A) : Apply grease.
5. Rear wheel speed sensor	(b) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)	(1360) : Apply thread lock to thread part.

Rear Wheel Assembly Removal and Installation (GSX650FAK9)

B917H22406026

Removal

- 1) Remove the rear wheel speed sensor (1) by removing the mounting bolts (2). Refer to "Rear Wheel Speed Sensor Removal and Installation in Section 4E in related manual".



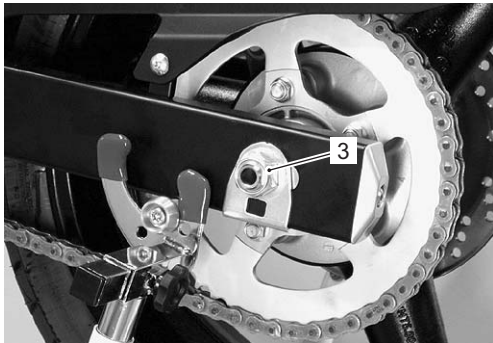
I917H2240015-01

- 2) Loosen the rear axle nut (3).
- 3) Raise the rear wheel off the ground and support the motorcycle with the jack or wooden block.

⚠ CAUTION

Make sure that the motorcycle is supported securely.

- 4) Remove the rear axle nut (3) and draw out the rear axle.

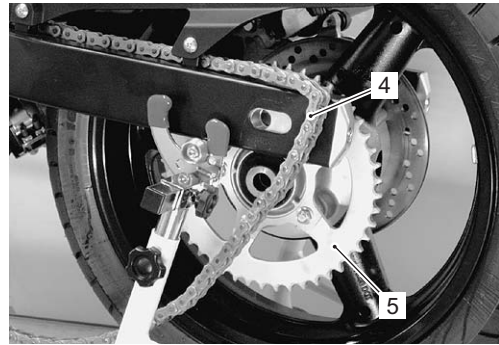


I917H2240016-01

- 5) Remove the rear axle and disengage the drive chain (4) from the rear sprocket (5).
- 6) Remove the rear wheel assembly.

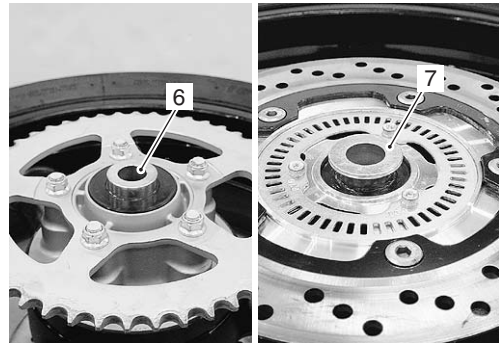
⚠ CAUTION

Do not operate the rear brake pedal with the rear wheel removed.



I917H2240017-01

- 7) Remove the spacer (6) and collar (7).

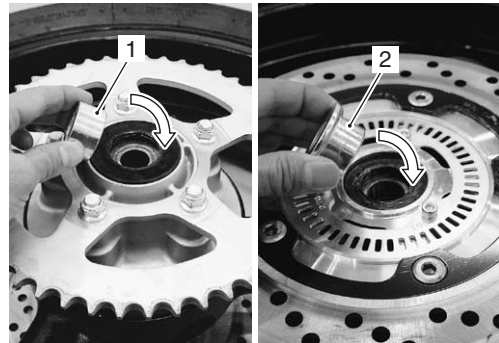


I917H2240018-01

Installation

Refer to "Wheel Speed Sensor and Sensor Rotor Inspection in Section 4E in related manual".

- 1) Install the spacer (1) and collar (2).



I717H2240020-01

- 2) Install the rear wheel with the rear axle and tighten the rear axle nut temporarily.
- 3) Adjust the drive chain slack after installing the rear wheel. Refer to "Drive Chain Inspection and Adjustment in Section 0B in related manual".

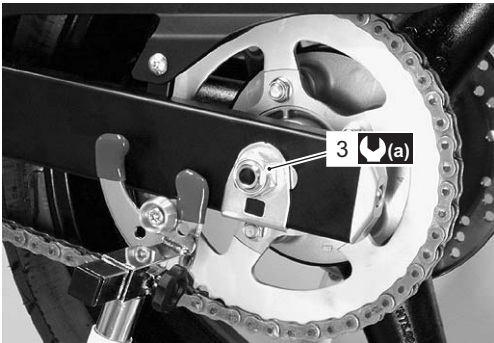
4) Tighten the rear axle nut (3) to the specified torque.

Tightening torque

Rear axle nut (a): 100 N·m (10.0 kgf-m, 72.5 lbf-ft)

⚠ WARNING

After remounting the rear wheel, pump the brake pedal several times to check for proper brake operation.



I917H2240019-01

- 5) Install the rear wheel speed sensor mounting bolts. Refer to “Rear Wheel Speed Sensor Removal and Installation in Section 4E in related manual”.
- 6) Check the clearance between the rear wheel speed sensor. Refer to “Rear Wheel Speed Sensor Removal and Installation in Section 4E in related manual”.

Specifications

Tightening Torque Specifications

B917H22407002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear axle nut	100	10.0	72.5	☞ (Page 2D-7)

NOTE

The specified tightening torque is described in the following.

“Front Wheel Components (GSX650FAK9) (Page 2D-2)”

“Front Wheel Assembly Construction (GSX650FAK9) (Page 2D-3)”

“Rear Wheel Components (GSX650FAK9) (Page 2D-4)”

“Rear Wheel Assembly Construction (GSX650FAK9) (Page 2D-5)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List in Section 0C in related manual”.

Special Tools and Equipment

Recommended Service Material

B917H22408001

NOTE

Required service material is also described in the following.

“Front Wheel Components (GSX650FAK9) (Page 2D-2)”

“Front Wheel Assembly Construction (GSX650FAK9) (Page 2D-3)”

“Rear Wheel Components (GSX650FAK9) (Page 2D-4)”

“Rear Wheel Assembly Construction (GSX650FAK9) (Page 2D-5)”

Section 4

Brake

CONTENTS

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For the items with asterisk (*) in the “CONTENTS” below, refer to the same section of the service manual mentioned in the “FOREWORD” of this manual.

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Brake Control System and Diagnosis ...	4A-1	Front Brakes	4B-*
Schematic and Routing Diagram.....	4A-1	Repair Instructions	4B-*
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Front Brake Hose Routing Diagram		Front Brake Pad Inspection.....	4B-*
(GSF650S).....	4A-*	Front Brake Pad Replacement.....	4B-*
Rear Brake Hose Routing Diagram.....	4A-*	Front Brake Caliper Removal and Installation.....	4B-*
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		ABS Information	4E-*
		Precautions for ABS (GSX650FAK9).....	4E-1

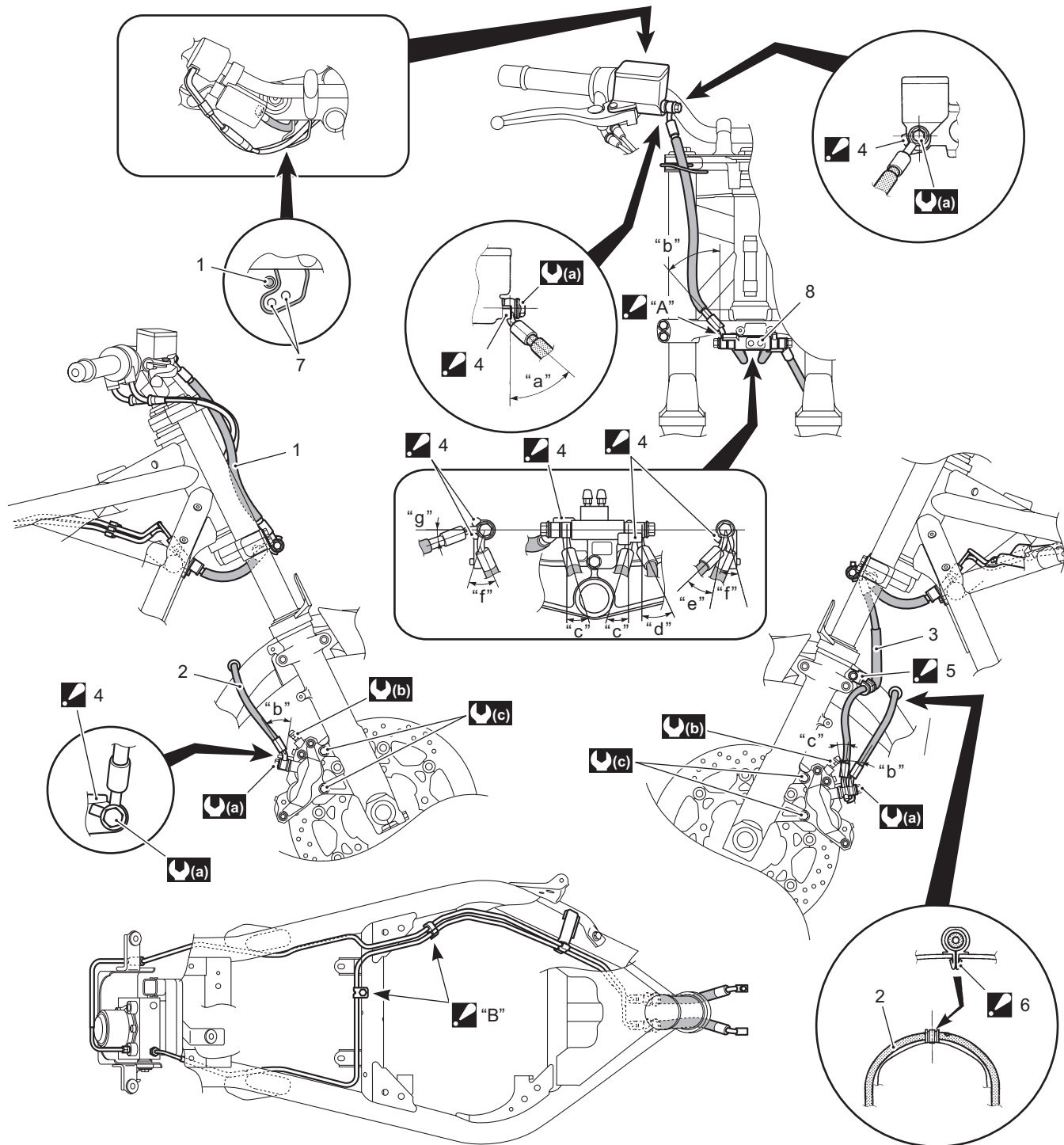
ABS Information (GSX650FAK9)	4E-1	DTC "43" (C1643): Wheel Speed Sensor Circuit Short (F)	4E-*
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Brake Control System and Diagnosis

Schematic and Routing Diagram

Front Brake Hose Routing Diagram (GSX650FAK9)

B917H24102004

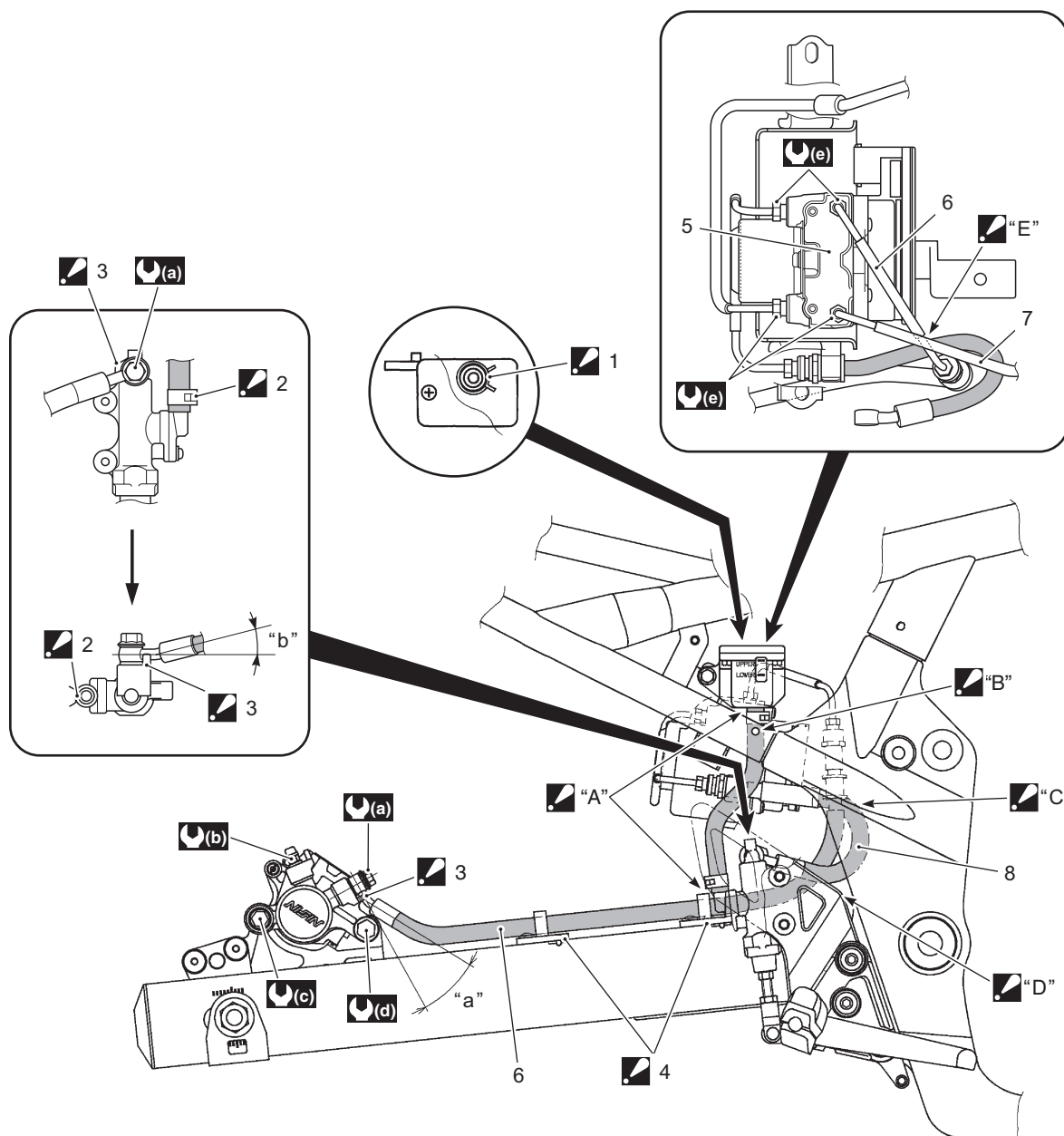


I917H2410001-04

1. Front brake hose No. 1	⚙️(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
2. Front brake hose No. 2	⚙️(b) : 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)
3. Front brake hose No. 2 (L)	⚙️(c) : 25 N·m (2.5 kgf-m, 18.0 lbf-ft)
⚙️ 4. Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	"a": 50°
⚙️ 5. Clamp : After positioning the clamp with the stopper, tighten the clamp bolt.	"b": 40°
⚙️ 6. Clamp : Insert the clamp to the hole of the front fender fully.	"c": 14°
7. Throttle cable	"d": 21°
8. Brake hose joint	"e": 42°
⚙️ "A": White marking of front brake hose No. 1 should face brake hose joint side.	"f": 49°
⚙️ "B": Clamp the brake pipe at the marking position.	"g": 20°

Rear Brake Hose Routing Diagram (GSX650FAK9)

B917H24102005



I917H2410002-03

1. Brake hose clamp : Brake hose clamp ends should face forward.	"C" : Pass the rear brake hose No. 1 inside of the rear brake hose No. 2.
2. Brake hose clamp : Brake hose clamp ends should face backward.	"D" : Pass the rear brake hose No. 1 outside of the rear brake hose No. 2.
3. Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	"E" : Pass the rear brake hose No. 2 under the brake hose No. 2.
4. Guide: : Position the guide with hole of swinging arm before tightening.	"a": 28°
5. ABS control unit/HU	"b": 14°
6. Rear brake hose No. 2	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
7. Brake hose No. 2	(b) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
8. Rear brake hose No. 1	(c) : 22 N·m (2.2 kgf-m, 16.0 lbf-ft)
"A" : Insert reservoir hose into root of reservoir tank firmly.	(d) : 27 N·m (2.7 kgf-m, 19.5 lbf-ft)
"B" : White marking of reservoir hose should face reservoir tank side.	(e) : 16 N·m (1.6 kgf-m, 11.5 lbf-ft)

Specifications

Tightening Torque Specifications

B917H24107002

NOTE

The specified tightening torque is described in the following.

“Front Brake Hose Routing Diagram (GSX650FAK9) (Page 4A-2)”

“Rear Brake Hose Routing Diagram (GSX650FAK9) (Page 4A-3)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List in Section 0C in related manual”.

ABS

Precautions

Precautions for ABS (GSX650FAK9)

B917H24500003

Refer to "Precautions for Electrical Circuit Service in Section 00 in related manual".

ABS Information (GSX650FAK9)

B917H24500004

⚠ WARNING

- **Be sure to bleed air from the brake fluid circuit when the brake is felt spongy or when a brake relating part is replaced.**
- **Never ride the motorcycle before bleeding the air.**

- Be sure to route the brake hoses correctly.
- The ABS does not shorten the motorcycle's braking distance. When riding down slopes or on wet or bumpy roads the braking distance is lengthened as compared to a motorcycle without ABS. In addition, braking distance increases more, when the road is slippery.
- The ABS does not control slides which may occur when braking while turning. As with a motorcycle that does not have ABS, it is best not apply the brakes while turning.
- The brake levers may move by themselves when they are applied. This is not a malfunction.
- Only use the specified tires.

General Description

Self-diagnosis Function and ABS Indicator Light Description (GSX650FAK9)

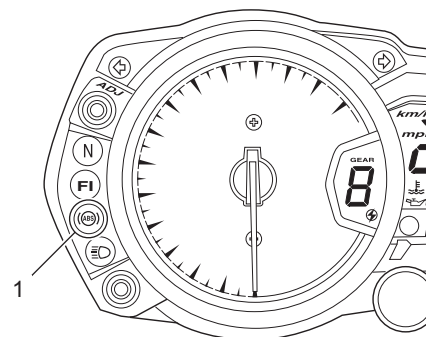
B917H24501009

The ABS control unit performs the self-diagnosis and can store any electronically detected malfunctions as diagnostic trouble codes. If a malfunction has occurred, the indicator light lights up to inform the rider of the malfunction. The special tool, when connected to the mode select coupler, enables the ABS indicator light to display the diagnostic trouble codes.

ABS Indicator Light

The ABS indicator light (1) informs the rider of any ABS malfunctions. If a malfunction occurred, the ABS indicator light flashes, during the self-diagnosis, to indicate the diagnostic trouble code so that the correct part can be repaired.

- When the ignition switch is turned to ON, the ABS indicator light lights up even if no malfunction has occurred, to indicate that the bulb is not burnt out. It will go off after the motorcycle is ridden at more than 10 km/h (6.2 mile/h).
- If an ABS malfunction has occurred, the ABS indicator light keeps lighting up.



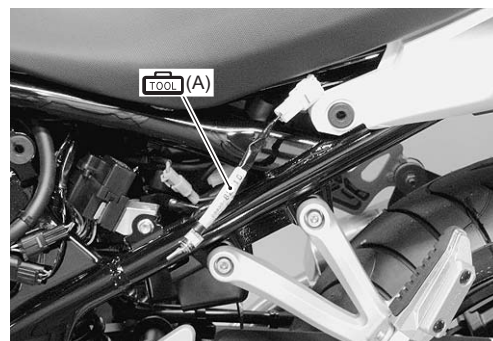
I917H2450003-01

NOTE

When a malfunction has occurred in the ABS, connect the special tool to the mode select coupler to display the diagnostic trouble code on the ABS indicator light. Refer to "DTC (Diagnostic Trouble Code) Output (GSX650FAK9) (Page 4E-12)".

Special tool

🔧 (A): 09930-82710 (Mode select switch)

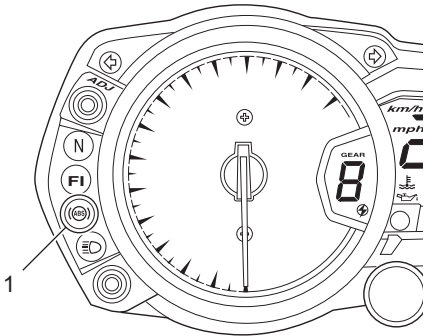


I917H2450004-01

ABS Operation and ABS Indicator Light

The ABS indicator light (1) shows the ABS operating condition. During normal operation, the ABS indicator light lights up when the ignition switch is turned to ON and goes off after the motorcycle is ridden at more than 10 km/h (6.2 mile/h). If a malfunction has occurred, the ABS indicator light keeps lighting up.

The ABS indicator light goes off when the motorcycle is ridden at more than 10 km/h.	The ABS is normally activated.
The ABS indicator light keeps lighting up even though the motorcycle is ridden at more than 10 km/h (6.2 mile/h).	One or more malfunction has been found and ABS activation been hanged up.
The ABS indicator light does not light up when turning the ignition switch ON.	Check the wire harness and combination meter. Refer to "ABS Indicator Light Inspection (GSX650FAK9) (Page 4E-6)".



I917H2450003-01

Stored DTCs (Diagnostic Trouble Codes)

As for the diagnostic trouble code, the code of the first malfunction occurred during one ignition ON period will be stored. Pay attention to the fact that even though there may occur several malfunctions in one ON-period, only one code will be stored. Codes of malfunction that occurred in the past are all stored, but the same diagnostic trouble code will not be redundant.

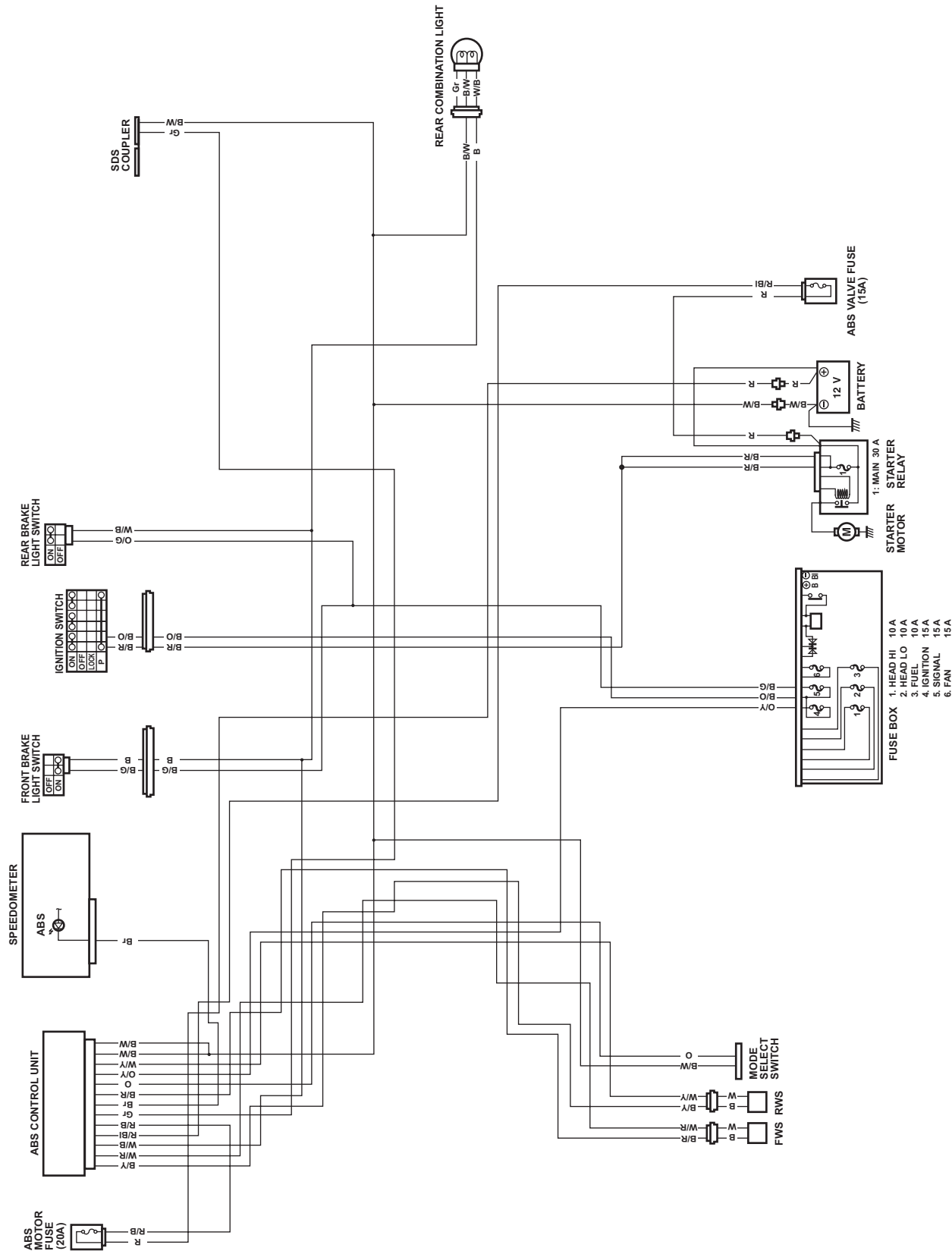
Check and see if any diagnostic trouble code remains, by actually running the machine to activate ABS and by carrying out the self-diagnosis after deleting the diagnostic trouble code once the malfunctioned part is repaired.

Schematic and Routing Diagram

ABS Wiring Diagram (GSX650FAK9)

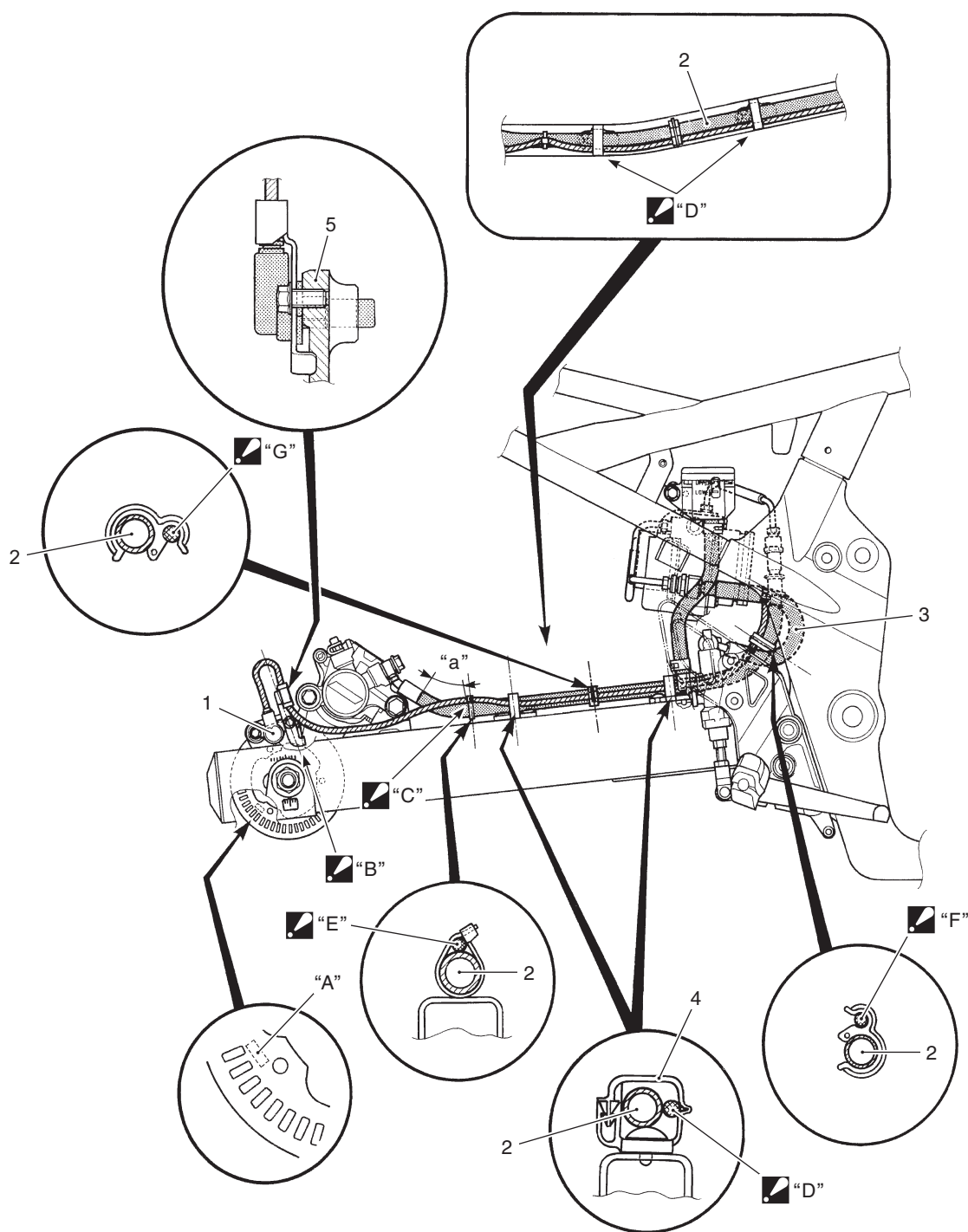
B917H24502005

Refer to "Wire Color Symbols in Section 0A in related manual".



Rear Wheel Speed Sensor Routing Diagram (GSX650FAK9)

B917H24502008



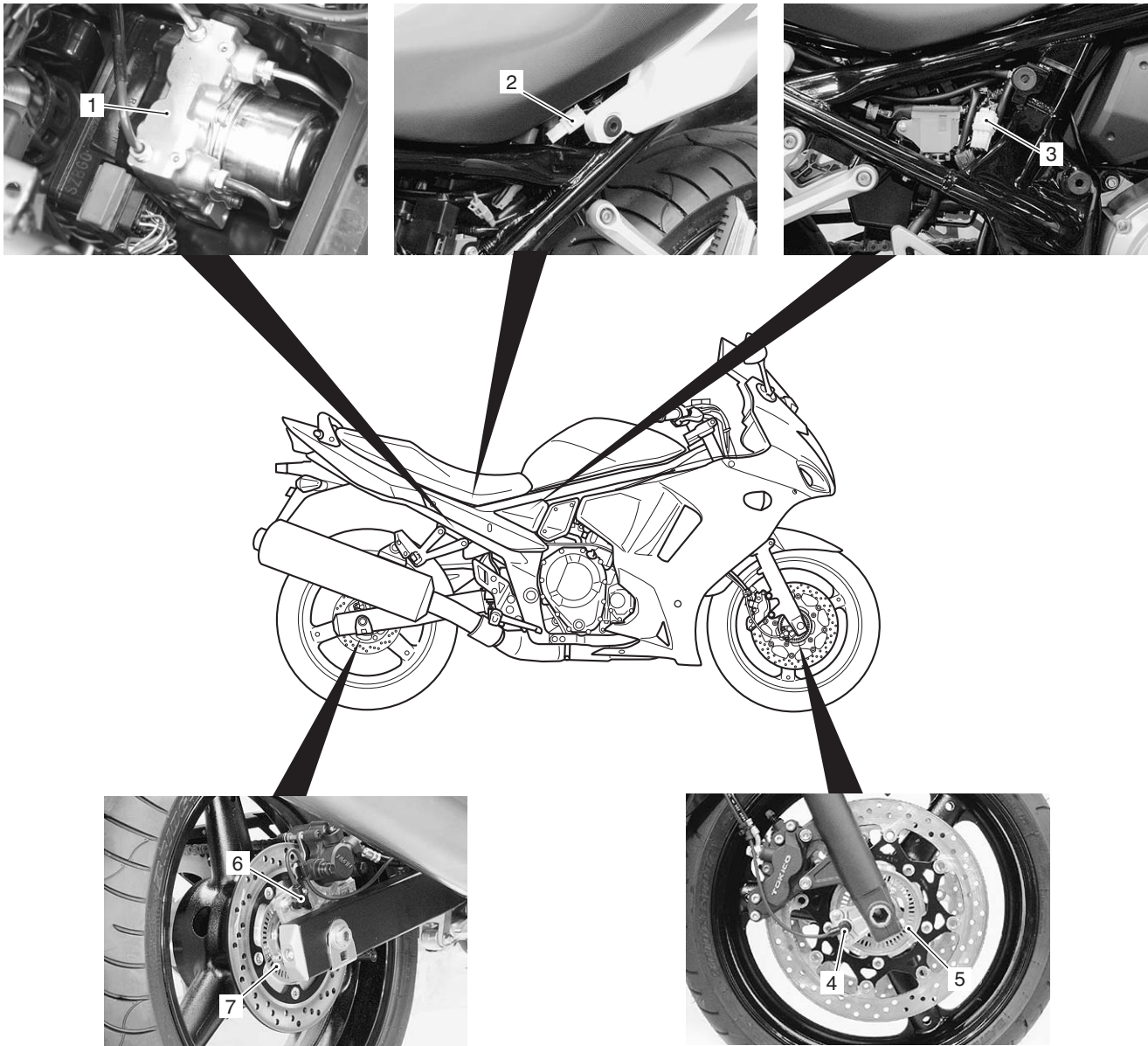
I917H2450045-01

1. Rear wheel speed sensor	"C": Clamp speed sensor lead wire with white tape matched green paint of brake hose.
2. Rear brake hose No. 2	"D": Pass the speed sensor lead wire inside of the brake hose guide.
3. Rear brake hose No. 1	"E": Pass the speed sensor lead wire over the brake hose.
4. Brake hose guide	"F": Clamp the speed sensor lead wire upper side of brake hose.
5. Rear brake caliper	"G": Pass the speed sensor lead wire outside of the brake hose.
"A": Outside mark	"a": 35 mm (1.4 in)
"B": After the clamp has contacted to the stopper, tighten the bolt.	

Component Location

ABS Components Location (GSX650FAK9)

B917H24503002



I917H2450007-03

1. ABS control unit/HU	3. SDS coupler	5. Front wheel speed sensor rotor	7. Rear wheel speed sensor rotor
2. Mode select coupler	4. Front wheel speed sensor	6. Rear wheel speed sensor	

Diagnostic Information and Procedures

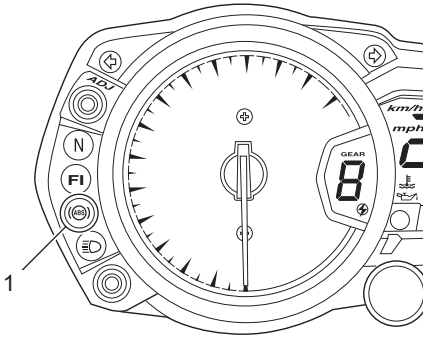
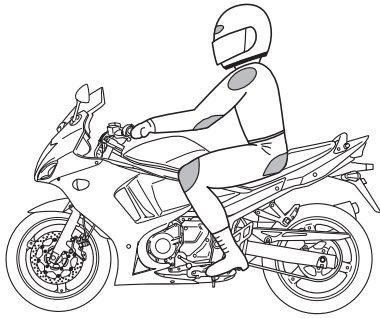
ABS Indicator Light Inspection (GSX650FAK9)

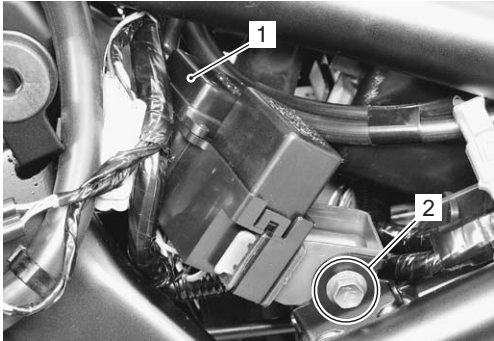
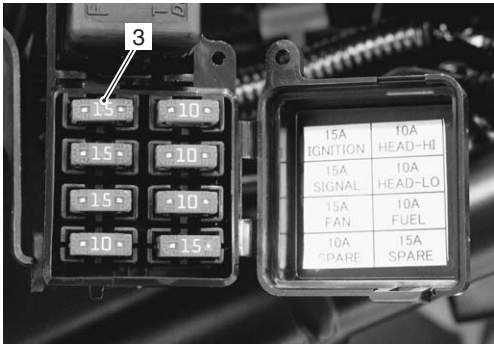
B917H24504027

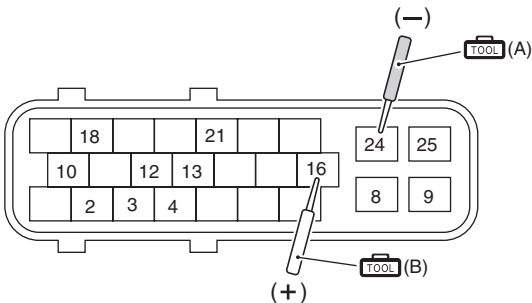
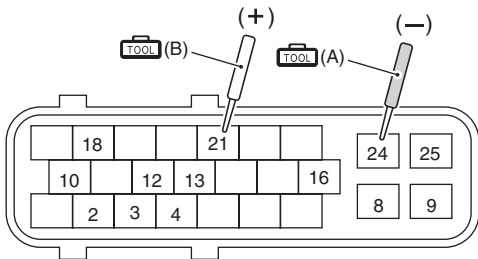
Wiring Diagram


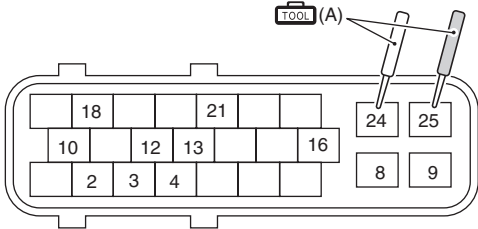
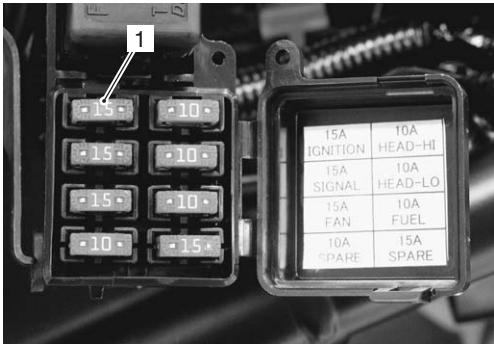
Refer to “ABS Unit Diagram in related manual”.



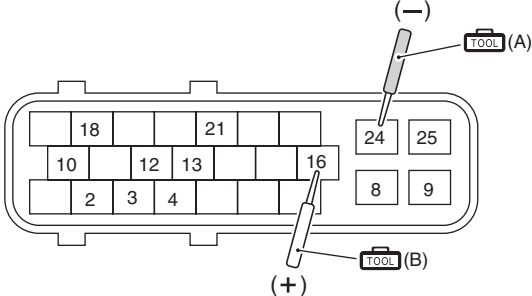


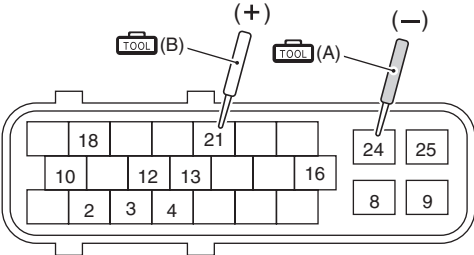
Troubleshooting

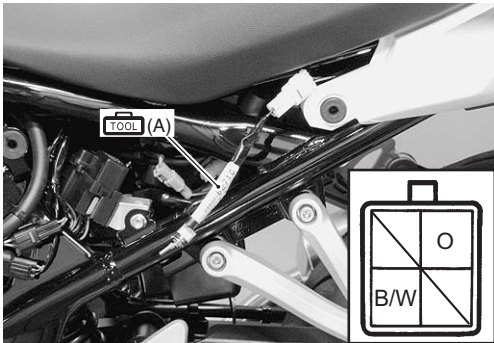
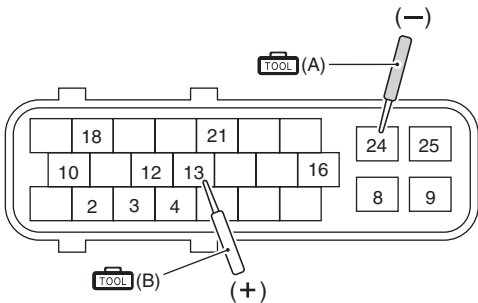
Step	Action	Yes	No
1	<div>1) Check if the ABS indicator light (1) lights up when turning the ignition switch ON.</div> <div></div> <div>I917H2450003-01</div> <div>Does the ABS indicator light up?</div>	Go to Step 2.	Go to Step 3.
2	<div>(The ABS indicator light lights up)</div> <div>1) Ride the motorcycle at more than 10 km/h (6.2 mile/h).</div> <div></div> <div>I917H2450011-01</div> <div>Does the ABS indicator light go off?</div>	Normal (No DTC exists)	<ul style="list-style-type: none">• DTC output (Refer to “DTC (Diagnostic Trouble Code) Output (GSX650FAK9) (Page 4E-12)”.)• If DTC can not be output (the ABS indicator light does not flash), go to Step 7.

Step	Action	Yes	No
3	<p>(The ABS indicator light does not light up)</p> <p>1) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation (GSF650/S/A/SAK7) in Section 9D in related manual”.</p> <p>2) Remove the fuse box (1) by removing the mounting bolt (2).</p>	Go to Step 4.	Replace the ignition fuse.
	<p></p> <p>I917H2450012-01</p> <p>3) Open the fuse box and inspect the ignition fuse (3).</p> <p>⚠ CAUTION</p> <p>If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.</p> <p><u>Ignition fuse</u></p> <p>15 A</p> <p></p> <p>I917H2450013-01</p> <p><i>Is the ignition fuse OK?</i></p>		

Step	Action	Yes	No
4	<p>1) Turn the ignition switch OFF.</p> <p>2) Disconnect the ABS control unit/HU coupler. Refer to "ABS Control Unit Coupler Disconnect and Connect in related manual".</p> <p>3) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "16" (O/Y) and "24" (B/W) at the coupler.</p> <p>Special tool TOOL (A): 09900-25008 (Multi circuit tester set) TOOL (B): 09900-25009 (Needle-point probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>Normal value ("16" – "24") Battery voltage (12.0 V and more)</p> <p>ABS control unit/HU coupler (Harness end)</p>  <p>I917H2450046-01</p> <p><i>Is the voltage between "16" and "24" normal?</i></p>	Go to Step 5.	Inspect the wire harness. (Faulty ignition or ground wire)
5	<p>1) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "21" (Br) and "24" (B/W) at the coupler.</p> <p>Special tool TOOL (A): 09900-25008 (Multi circuit tester set) TOOL (B): 09900-25009 (Needle-point probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>Normal value ("21" – "24") 7.0 V and more</p> <p>ABS control unit/HU coupler (Harness end)</p>  <p>I917H2450047-01</p> <p><i>Is the voltage between "21" and "24" normal?</i></p>	Go to Step 6.	<ul style="list-style-type: none"> Inspect the wire harness. (Faulty indicator light wire) Signal fuse is blown.

Step	Action	Yes	No
6	<p>1) Turn the ignition switch OFF.</p> <p>2) Check for continuity between “24” (B/W) at the coupler and body ground, also “25” (B/W) at the coupler and body ground.</p> <p>Special tool  (A): 09900–25008 (Multi circuit tester set)</p> <p>Tester knob indication Continuity (•)))</p> <p>ABS control unit/HU coupler (Harness end)</p>  <p>I718H1450038-02</p> <p><i>Are there continuity between “24”, “25” and body ground?</i></p>	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty ground wire)
7	<p>(The ABS indicator light does not go off)</p> <p>1) Turn the ignition switch OFF.</p> <p>2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation (GSF650/S/A/SAK7) in Section 9D in related manual”.</p> <p>3) Remove the fuse box mounting bolt. Refer to “ABS Control Unit Coupler Disconnect and Connect in related manual”.</p> <p>4) Open the fuse box and inspect the ignition fuse (1).</p> <p>⚠ CAUTION</p> <p>If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.</p> <p><u>Ignition fuse</u> 15 A</p>  <p>I718H1450039-01</p> <p><i>Is the ignition fuse OK?</i></p>	Go to Step 8.	Replace the ignition fuse.

Step	Action	Yes	No
8	<p>1) Turn the ignition switch OFF.</p> <p>2) Disconnect the ABS control unit/HU coupler. Refer to “ABS Control Unit Coupler Disconnect and Connect in related manual”</p> <p>3) Turn the ignition switch ON with the ABS control unit/HU coupler disconnected, measure the voltage between “16” (O/Y) and “24” (B/W) at the coupler.</p> <p>Special tool  (A): 09900-25008 (Multi circuit tester set)  (B): 09900-25009 (Needle-point probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>Normal value (“16” – “24”) Battery voltage (12.0 V and more)</p> <p>ABS control unit/HU coupler (Harness end)</p>  <p>I917H2450048-01</p> <p><i>Is the voltage between “16” and “24” normal?</i></p>	Go to Step 9.	Inspect the wire harness. (Faulty ignition or ground wire)
9	<p>1) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between “21” (Br) and “24” (B/W) at the coupler.</p> <p>Special tool  (A): 09900-25008 (Multi circuit tester set)  (B): 09900-25009 (Needle-point probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>Normal value (“21” – “24”) 7.0 V and more</p> <p>ABS control unit/HU coupler (Harness end)</p>  <p>I917H2450047-01</p> <p><i>Is the voltage between “21” and “24” normal?</i></p>	Go to Step 10.	Inspect the wire harness. (Faulty indicator light wire)

Step	Action	Yes	No
10	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation (GSF650/S/A/SAK7) in Section 9D in related manual”.</p> <p>3) Short the mode select coupler terminals (O – B/W) using the special tool.</p> <p>Special tool TOOL (A): 09930–82710 (Mode select switch)</p>  <p style="text-align: right; font-size: small;">I917H2450014-01</p> <p>4) Check for continuity between “13” (O) and “24” (B/W) at the coupler.</p> <p>Special tool TOOL (A): 09900–25008 (Multi circuit tester set) TOOL (B): 09900–25009 (Needle-point probe set)</p> <p>Tester knob indication Continuity (•)))</p> <p>ABS control unit/HU coupler (Harness end)</p>  <p style="text-align: right; font-size: small;">I917H2450049-01</p> <p><i>Is there continuity between “13” and “24”?</i></p>	Replace the ABS control unit/HU.	Inspect the wire harness. (Faulty mode select switch wire)

DTC (Diagnostic Trouble Code) Output (GSX650FAK9)

B917H24504028

NOTE

- Even through the ABS is operating correctly, a DTC is memorized in any of the following conditions.
 - If the motorcycle is put on its centerstand, the engine is started and only the rear wheel is rotated.
 - Previous malfunctions were repaired, but the DTCs were not deleted.
- After carrying out DTC deleting and ABS operation check, explain to the customer that the ABS is operating correctly. Refer to “DTC (Diagnostic Trouble Code) Deleting in related manual”.

Use of Mode Select Switch

Connect the special tool to the mode select coupler to output the memorized DTCs on the ABS indicator light.

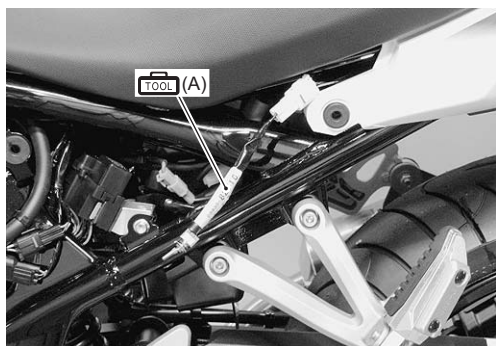
- 1) Turn the ignition switch OFF.
- 2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation (GSF650/S/A/SAK7) in Section 9D in related manual”.
- 3) Connect the special tool to the mode select coupler (1) (O – B/W).

Special tool

 (A): 09930–82710 (Mode select switch)



I917H2450015-01



I917H2450004-01

- 4) Switch the special tool to ON.



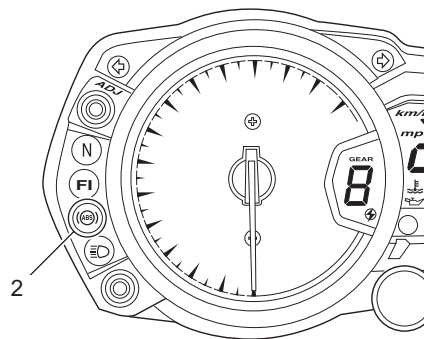
I718H1450040-02

- 5) Turn the ignition switch ON.

The ABS indicator light (2) starts flashing to indicate the DTC. Refer to “DTC Table in related manual”.

NOTE

- If there is a DTC, the ABS indicator light keeps flashing cyclically and repeatedly.
- If there is no DTC, the ABS indicator light keeps lighting on.
- If the DTCs are to be output for a long time, remove the HEAD-LO fuse in order to prevent the battery from discharging.



I917H2450016-01

- 6) Turn the ignition switch OFF and disconnect the special tool.

A two-digit DTC is shown through the flashing pattern of the ABS indicator light. A number between 1 and 9 is represented by the number of times that the ABS indicator light lights up in interval of 0.4 seconds and the separation between the tens and ones are indicated by the light staying off for 1.6 seconds. In addition, the separation between the start code and the DTC is indicated by the light being off for 3.6 seconds. After the start code is displayed, DTCs appear from the smallest number code.



"a": Initial minimum light ON time (About 2 seconds)	"e": Main-sub code interval (1.6 seconds)
"b": Error code interval (About 3.6 seconds)	"f": Sub code light ON time (0.4 seconds)
"c": Main code light ON time (0.4 seconds)	"g": Sub code light OFF time (0.4 seconds)
"d": Main code light OFF time (0.4 seconds)	


Use of SDS


NOTE

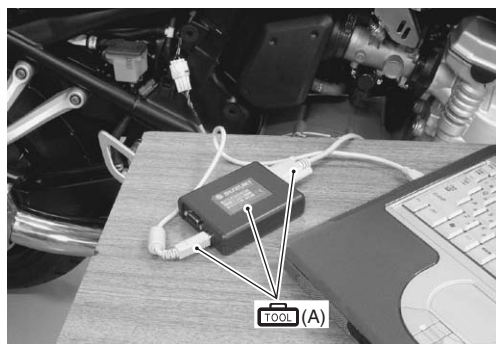
- Don't disconnect couplers from ABS control unit/HU, the battery cable from the battery, ABS control unit/HU ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ABS control unit/HU memory.
- DTC stored in ABS control unit/HU memory can be checked by the SDS.

- 1) Remove the right frame cover. Refer to "Exterior Parts Removal and Installation (GSF650/S/A/SAK7) in Section 9D in related manual".
- 2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

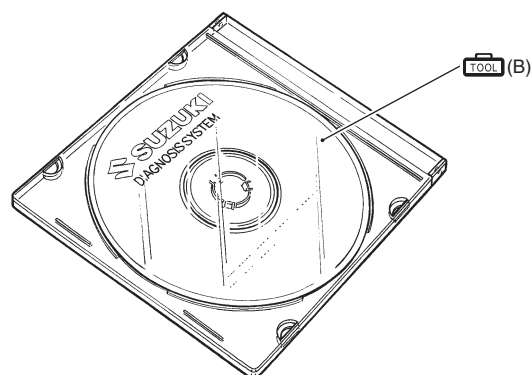
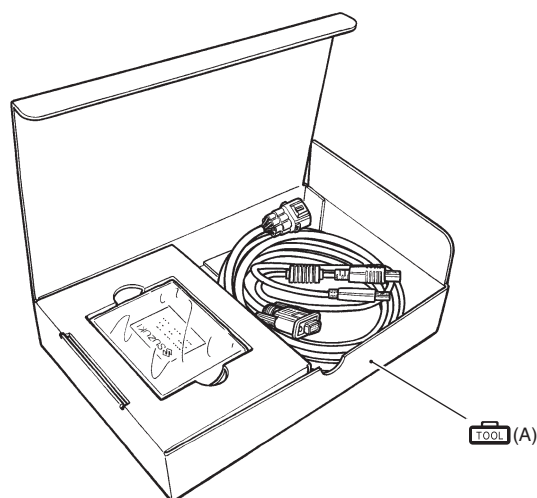
Special tool

 (A): 09904-41010 (SUZUKI Diagnostic system set)

 (B): 99565-01010-020 (CD-ROM Ver.20)



I718H1450047-01



I705H1110116-03

- 3) Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.

NOTE

- Not only is SDS used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.
- How to use trigger. (Refer to the SDS operation manual for further details.)

- 4) Close the SDS tool and turn the ignition switch OFF.

DTC “55” (C1655): ABS Control Unit Malfunction (GSX650FAK9)



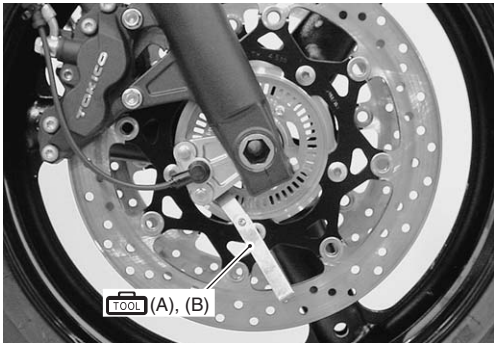
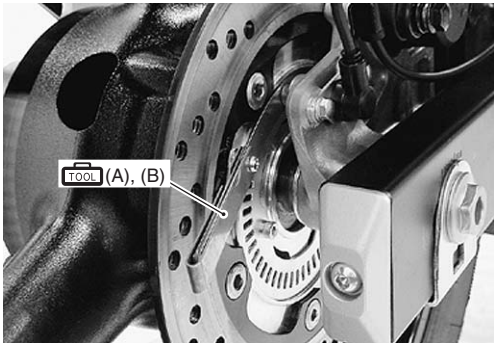
B917H24504047

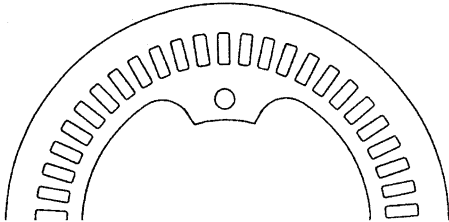
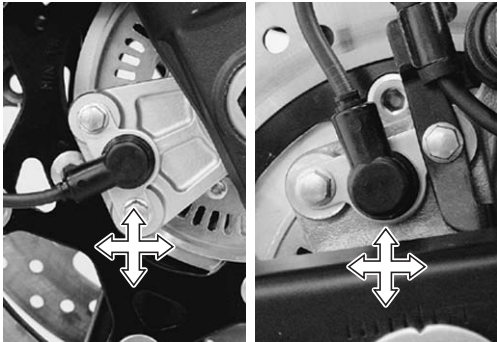
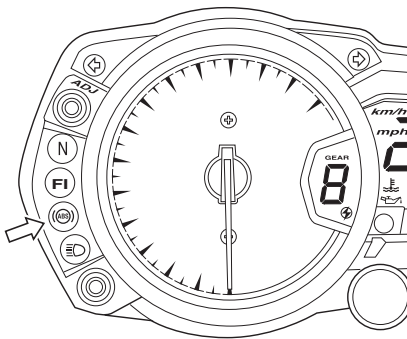
Possible Cause

Faulty ABS control unit/HU

Troubleshooting**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to “DTC (Diagnostic Trouble Code) Deleting in related manual”.

Step	Action	Yes	No
1	<p>1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge.</p> <p>Special tool  (A): 09900–20803 (Thickness gauge)  (B): 09900–20806 (Thickness gauge)</p> <p>Wheel speed sensor – Sensor rotor clearance 0.3 – 1.5 mm (0.012 – 0.059 in)</p> <p>Front</p>  <p>I717H2450009-01</p> <p>Rear</p>  <p>I717H2450011-01</p> <p>Are the clearances OK?</p>	Go to Step 2.	Adjust the clearance.

Step	Action	Yes	No
2	<p>1) Inspect both of the wheel speed sensor rotors for damage and check that no foreign objects are caught in the rotor openings.</p>  <p>I718H1450064-01</p> <p><i>Are the rotors OK?</i></p>	Go to Step 3.	Clean or replace the sensor rotor.
3	<p>1) Check that the front and rear wheel speed sensors are mounted securely.</p>  <p>I717H2450022-01</p> <p><i>Are the sensors mounted securely?</i></p>	Go to Step 4.	Tighten the mounting bolts or replace the bracket if necessary.
4	<p>1) Delete DTCs and repeat the code output procedure. Refer to "DTC (Diagnostic Trouble Code) Deleting in related manual" and "DTC (Diagnostic Trouble Code) Output (GSX650FAK9) (Page 4E-12)".</p>  <p>I917H2450031-01</p> <p><i>Is the DTC "55" (C1655) output again?</i></p>	Replace the ABS control unit/HU.	Intermittent trouble.

Repair Instructions

Front Wheel Speed Sensor Rotor Removal and Installation (GSX650FAK9)

B917H24506011

⚠ CAUTION

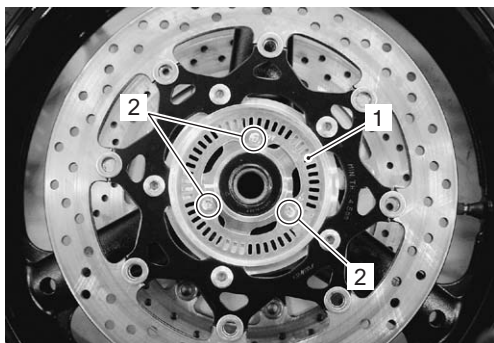
- The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.
- Do not hit the front wheel speed sensor rotor when dismantling the front wheel.

Removal

- 1) Remove the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (GSF650A/UA/SA/ASUK7) in Section 2D in related manual".
- 2) Remove the front wheel speed sensor rotor (1) by removing its bolts (2).

⚠ CAUTION

When replacing the tire, make sure not to damage the sensor rotor.



I917H2450036-01

Installation

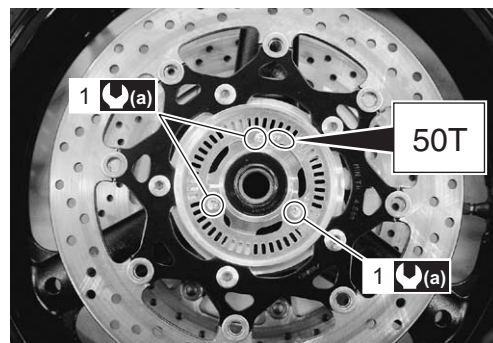
Refer to "Wheel Speed Sensor and Sensor Rotor Inspection in related manual".

Install the front wheel speed sensor rotor in the reverse order of removal. Pay attention to the following points:

- Install the wheel speed sensor rotor as the letters "50T" face outside.
- Tighten the wheel speed sensor rotor bolts (1) to the specified torque.

Tightening torque


Wheel speed sensor rotor bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)



I917H2450037-01

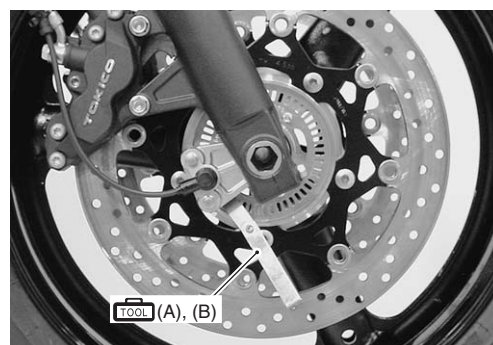
- Install the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (GSF650A/UA/SA/ASUK7) in Section 2D in related manual".
- Check the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge.

Special tool

 (A): 09900-20803 (Thickness gauge)

 (B): 09900-20806 (Thickness gauge)

Wheel speed sensor – Sensor rotor clearance
0.3 – 1.5 mm (0.012 – 0.059 in)



I717H2450009-01

Rear Wheel Speed Sensor Rotor Removal and Installation (GSX650FAK9)

B917H24506012

⚠ CAUTION

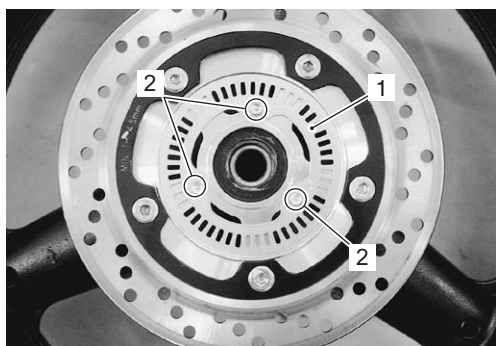
- The ABS is made up of many precision parts; never subject it to strong impacts or allow it to become dirty or dusty.
- Do not hit the rear wheel speed sensor rotor when dismantling the rear wheel.

Removal

- 1) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation (GSX650FAK9) in Section 2D (Page 2D-6)"
- 2) Remove the rear wheel speed sensor rotor (1) by removing its bolts (2).

⚠ CAUTION

When replacing the tire, make sure not to damage the sensor rotor.



I917H2450038-01

Installation

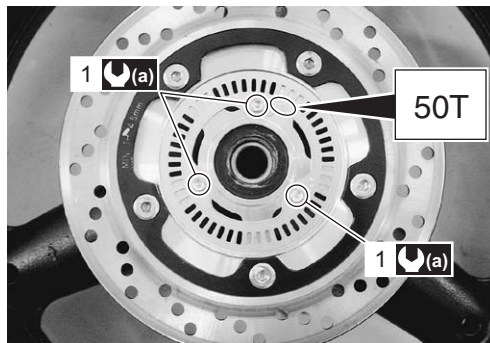
Refer to "Wheel Speed Sensor and Sensor Rotor Inspection in related manual".

Install the rear wheel speed sensor rotor in the reverse order of removal. Pay attention to the following points:

- Install the wheel speed sensor rotor as the letters "50T" face outside.
- Tighten the wheel speed sensor rotor bolts (1) to the specified torque.

Tightening torque

Wheel speed sensor rotor bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)



I917H2450039-01

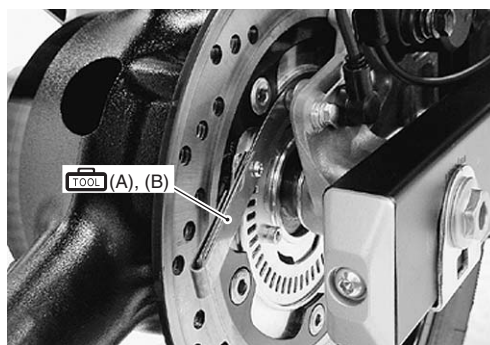
- Install the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation (GSX650FAK9) in Section 2D (Page 2D-6)".
- Check the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge.

Special tool

TOOL (A): 09900-20803 (Thickness gauge)

TOOL (B): 09900-20806 (Thickness gauge)

Wheel speed sensor – Sensor rotor clearance
0.3 – 1.5 mm (0.012 – 0.059 in)



I717H2450011-01

Specifications

Tightening Torque Specifications

B917H24507001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Wheel speed sensor rotor bolt	6.5	0.65	4.7	☞ (Page 4E-17) / ☞ (Page 4E-18)

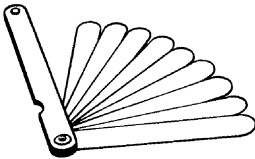
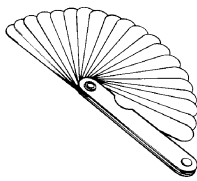
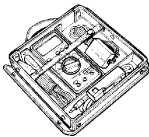
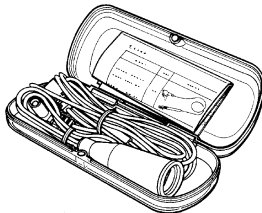
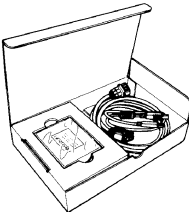
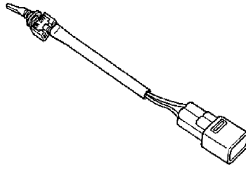
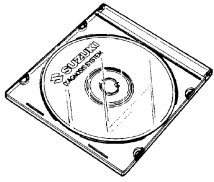
Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List in Section 0C in related manual”.

Special Tools and Equipment

Special Tool

B917H24508001

09900–20803 Thickness gauge ☞ (Page 4E-17) / ☞ (Page 4E-18) / ☞ (Page 4E-15)		09900–20806 Thickness gauge ☞ (Page 4E-17) / ☞ (Page 4E-18) / ☞ (Page 4E-15)	
09900–25008 Multi circuit tester set ☞ (Page 4E-8) / ☞ (Page 4E-8) / ☞ (Page 4E-9) / ☞ (Page 4E-10) / ☞ (Page 4E-10) / ☞ (Page 4E-11)		09900–25009 Needle-point probe set ☞ (Page 4E-8) / ☞ (Page 4E-8) / ☞ (Page 4E-10) / ☞ (Page 4E-10) / ☞ (Page 4E-11)	
09904–41010 SUZUKI Diagnostic system set ☞ (Page 4E-14)		09930–82710 Mode select switch ☞ (Page 4E-1) / ☞ (Page 4E-11) / ☞ (Page 4E-12)	
99565–01010–020 CD-ROM Ver.20 ☞ (Page 4E-14)			

Section 5

Transmission / Transaxle

CONTENTS

NOTE

For the items with asterisk (*) in the “CONTENTS” below, refer to the same section of the service manual mentioned in the “FOREWORD” of this manual.

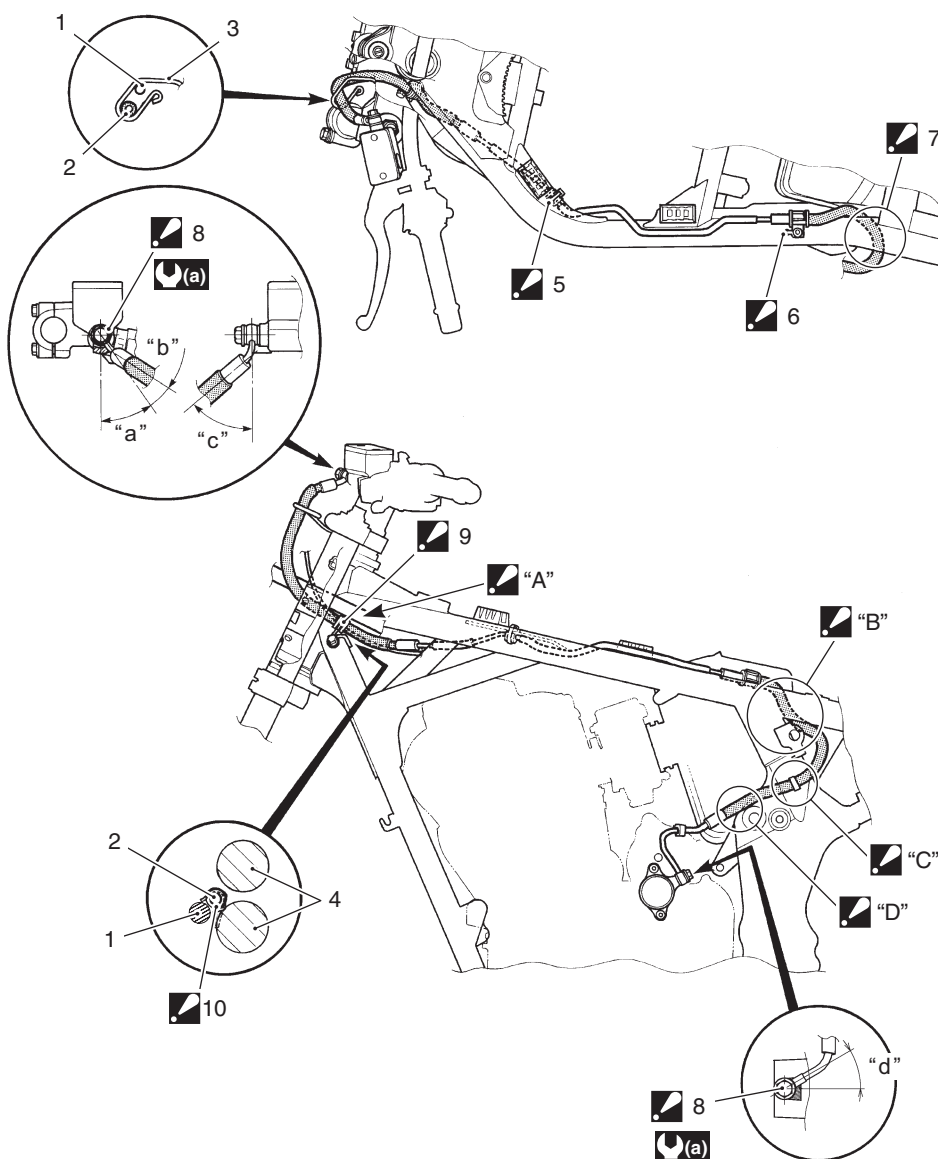
Precautions	5-*	Clutch	5C-1
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		Recommended Service Material	5C-*
		Special Tool	5C-*

Clutch

Schematic and Routing Diagram

Clutch Hose Routing Diagram (GSX650FAK9)

B917H25302002



I917H2530001-04

1. Wiring harness	☑ "A": Pass the wiring harness through upper the clutch hose No. 3 clamp.
2. Clutch hose	☑ "B": Clutch hose : Pass through the clutch hose between the frame and fuel tank rail. Be careful not to contact the clutch hose and frame cover bracket.
3. Guide	☑ "C": Pass the clutch hose through outside of the frame.
4. Frame	☑ "D": Pass the clutch hose through outside of the wiring harness.
☑ 5. Clutch hose clamp : Insert the clutch hose clamp end to the hole of the frame fully.	"a": 35°
☑ 6. Clutch hose No. 2 clamp : After positioning the clamp with stopper, tighten the bolt.	"b": 21°
☑ 7. Clutch hose : Pass through the clutch hose under the frame.	"c": 49°
☑ 8. Union bolt : After the clutch hose union has contacted the stopper, tighten the union bolt.	"d": 30°
☑ 9. Clutch hose No. 3 clamp : After positioning the clamp with stopper, tighten the bolt.	⚙️ (a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
☑ 10. Grommet : Install the grommet of the clutch hose to the clutch hose guide properly.	

Specifications

Tightening Torque Specifications

B917H25307002

NOTE

The specified tightening torque is described in the following.
“Clutch Hose Routing Diagram (GSX650FAK9) (Page 5C-1)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List in Section 0C in related manual”.

Section 9

Body and Accessories

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Wiring Systems

Schematic and Routing Diagram

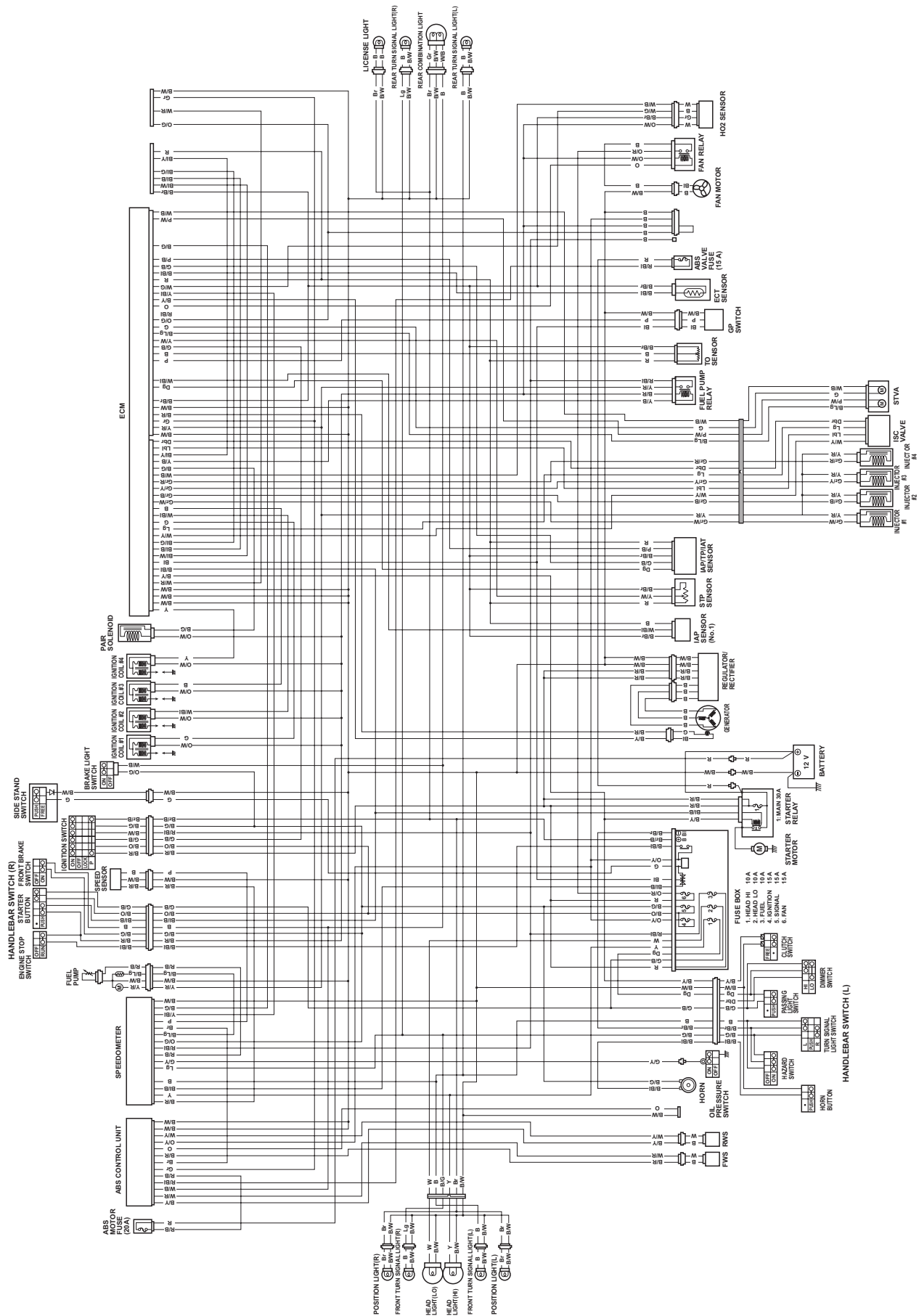
Wiring Diagram (GSX650FAK9)

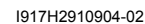
B917H29102009

Refer to "Wire Color Symbols in Section 0A in related manual".

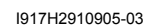
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For E-02, 19



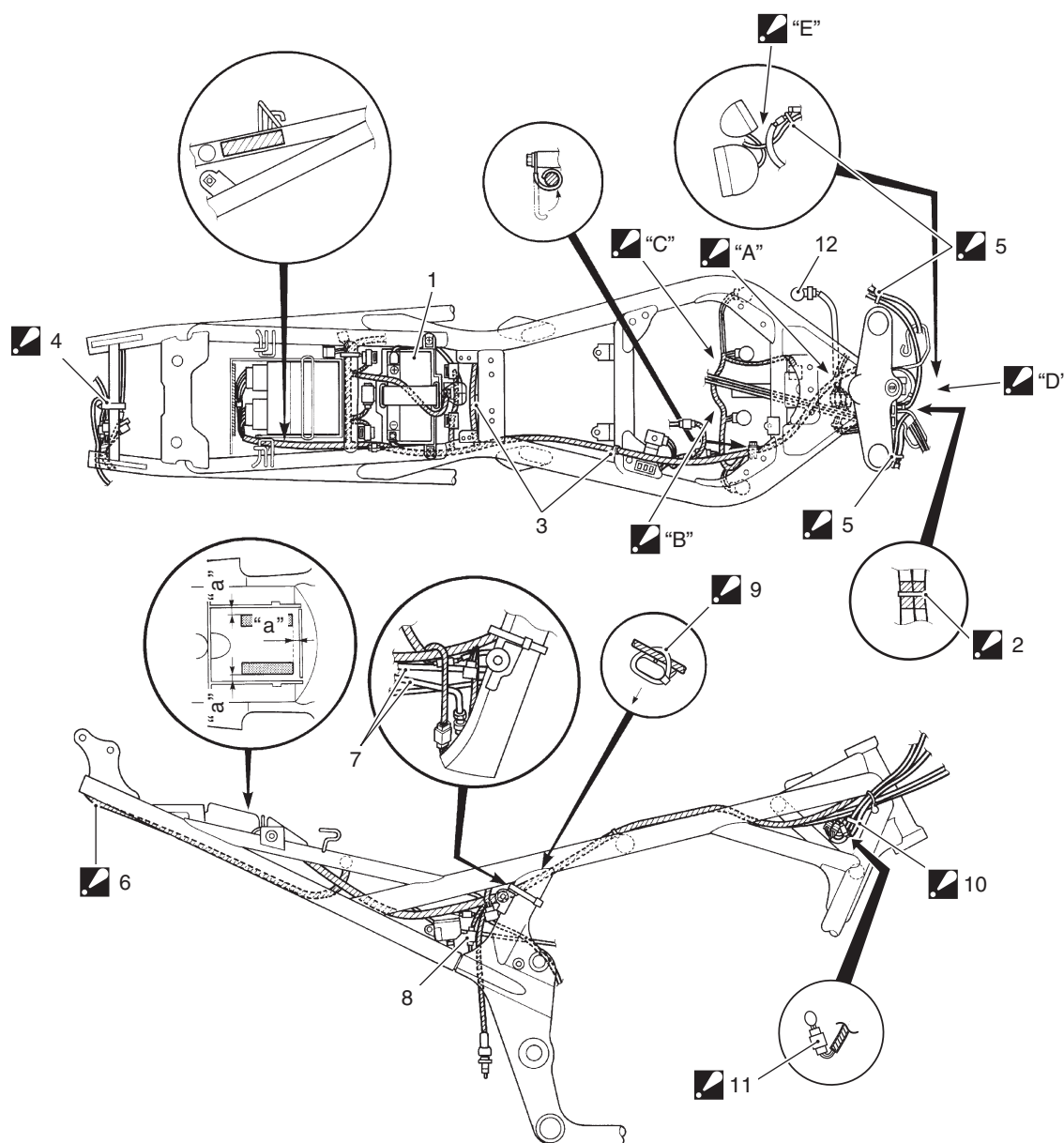


For E-33



Wiring Harness Routing Diagram (GSX650FAK9)

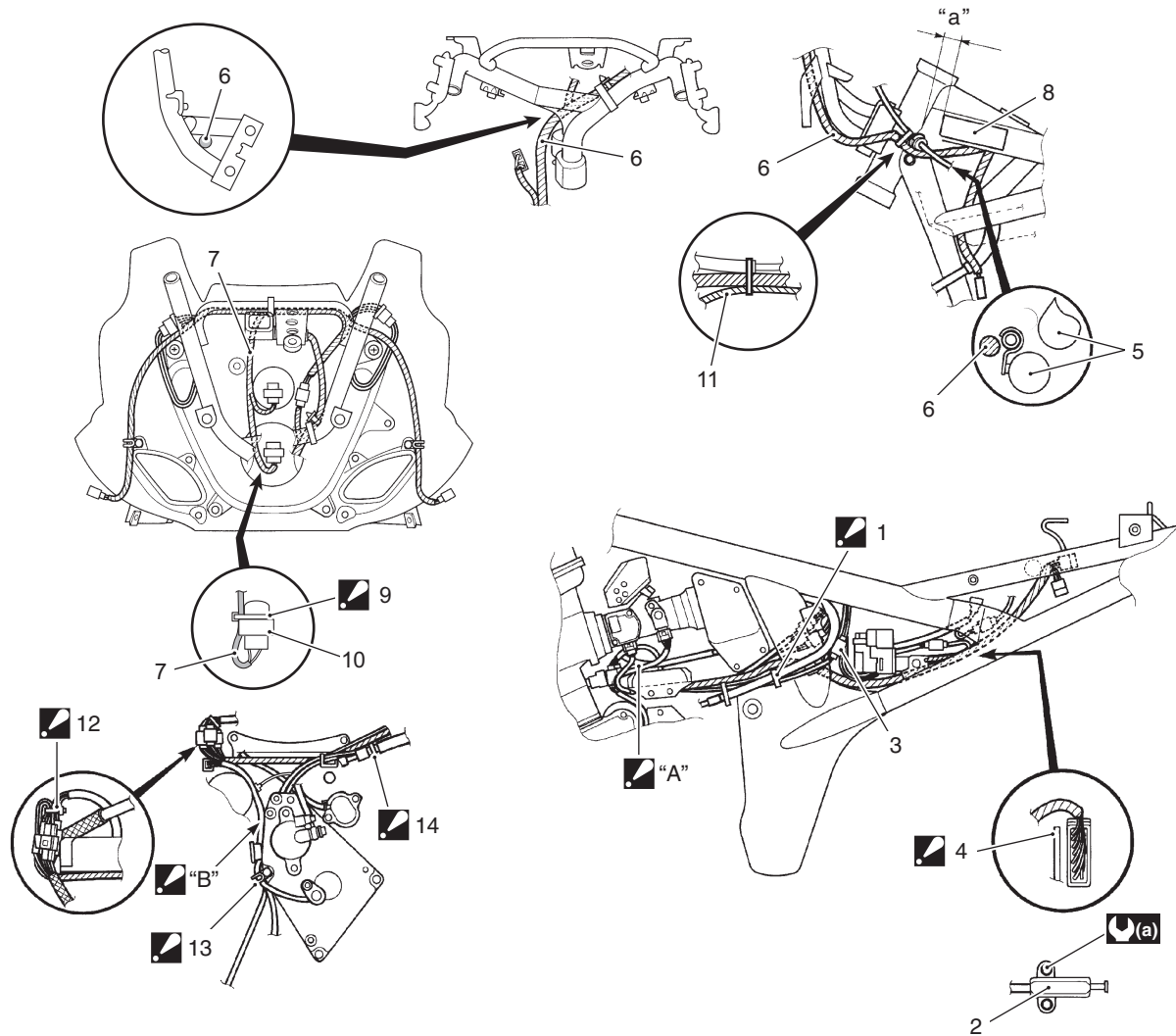
B917H29102008



I917H2910901-07

1. Battery	10. Clamp : Clamp the handle switch lead wires, ignition switch lead wire and front wheel speed sensor lead wire (ABS).
2. Clamp : Clamp the handle switch right and left lead wire at the middle of blue taping.	11. Front wheel speed sensor coupler : Set the coupler vertically.
3. Clamp	12. EVAP purge control valve (E-33 only)
4. Clamp : Clamp tip backward.	"A": Pass the horn and fan lead wire upper the brake hose (ABS).
5. Clamp : Cut the tip of clamp after clamping.	"B": Pass the lead wire under the water hoses.
6. Wiring harness : Be careful not to pinch the wiring harness with the frame and fender.	"C": Slack the lead wire downward.
7. Brake hose (ABS)	"D": Do not make slacked lead wire.
8. Rear wheel speed sensor coupler	"E": Pass the speed meter lead wire right side of ignition switch.
9. Clamp : Clamp the wiring harness and brake hose (ABS).	"a": 5 – 10 mm (0.2 – 0.4 in)

9A-6 Wiring Systems:



I917H2910902-02

1. Clamp : Clamp the speed sensor lead wire and HO2 sensor lead wire.	10. Headlight high beam bulb cap
2. Side-stand switch	11. Horn lead wire
3. HO2 sensor coupler	12. Clamp : Clamp the regulator/rectifier lead wire and generator lead wire.
4. ABS control unit/HU bracket : Do not contact the ABS unit wiring harness with the bracket.	13. Clamp : Clamp the speed sensor lead wire, HO2 sensor lead wire and side-stand switch lead wire.
5. Frame	14. Clamp : Clamp the lead wire inside of clutch hose.
6. Wiring harness No. 1	"A" : Pass the regulator/rectifier lead wire behind ISC valve hose.
7. Wiring harness No. 2	"B" : Set the generator lead wire between starter motor and sprocket inner cover.
8. ICES CANADA label (E-28 only)	(a) : 14 N·m (1.4 kgf-m, 10.0 lbf-ft)
9. Clamp : Clamp the wiring harness and headlight high beam bulb cap.	"a" : 20 ± 5 mm (0.8 ± 0.2 in)

Specifications

Service Data (GSX650FAK9)

B917H2910S004

Electrical

	Item	Specification	Note
Fuse size	ABS motor	20 A	
	ABS valve	15 A	

Tightening Torque Specifications

B917H2910S005

NOTE

The specified tightening torque is described in the following.

“Wiring Harness Routing Diagram (GSX650FAK9) (Page 9A-5)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List in Section 0C in related manual”.

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